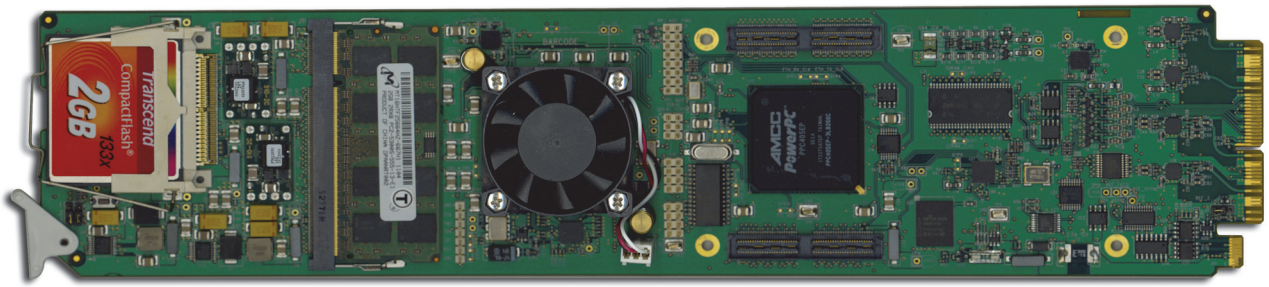
openGear

TES-8643

3G/HD/SD VANC Processor

User Manual



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6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

TES-8643 User Manual

- Ross Part Number: 8643DR-004-02
- Release Date: April 30, 2014.

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Patents

Patent numbers 4,205,346; 5,115,314; 5,280,346; 5,561,404; 7,034,886; 7,508,455; 7,602,446; 7,834,886; 7,914,332; 8,499,019 B2; 2039277; 1237518; 1127289 and other patents pending.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and nay associated equipment, refer to the "**Important Safety Instructions**" listed below to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage to persons or equipment.

Warning — *The symbol with the word "**Warning**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.*

Caution — *The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

Notice — *The symbol with the word "**Notice**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.*

ESD Susceptibility — *This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.*

Important Safety Instructions

Caution — *This product is intended to be a component product of the openGear frame. Refer to the DFR-8300 and OG3-FR Series Frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.*

Warning — *Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.*

Warning — *Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.*
This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair. To reduce the risk of fire, replacement fuses must be the same time and rating. Only use attachments/accessories specified by the manufacturer.

Warning — *This product includes an "Ethernet Port" which allows this product to be connected to a local area network (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.*

EMC Notices

United States of America
FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.*

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe "A" est conforme a la norme NMB-003 du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of CE Directive 93/68/EEC.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.

Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Maintenance/User Serviceable Parts

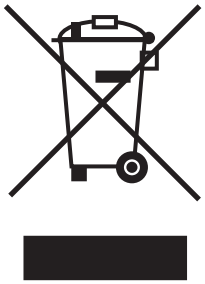
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All openGear products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the "Warranty and Repair Policy" section in this manual for details.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed out wheelie bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performance of our products.

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Introduction

In This Chapter

This chapter contains the following sections:

- Product Overview
- Features
- Functional Block Diagram
- Workflow Overview
- User Interfaces
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear TES-8643 3G/HD/SD VANC Processor. Your card is part of a full line of Digital Products within the openGear Terminal Equipment family of products, backed by Ross Video's experience in engineering and design expertise since 1974.

You will be pleased at how easily your new card fits into your overall working environment. Equally pleasing is the product quality, reliability and functionality. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your card, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is always available for consultation, training, or service.

Product Overview

The TES-8643 is a broadcast-quality ancillary data encoder/decoder for uncompressed digital video signals. It operates with signals that comply with SMPTE 424M, SMPTE 292M, and SMPTE 259M. The TES-8643 can be used to add the data to the digital video stream, or extract it, or both.

The TES-8643 can be part of a system that allows data to be inserted into the VANC (Vertical Ancillary) area of an SDI video signal for distribution over a video network. This method of data embedding ensures that the data follows the video signal wherever it is routed. Eventually, the video signal reaches a location where the data is extracted and processed.

The TES-8643 inserts data having various formats and purposes into the vertical ancillary (VANC) space of its video input signal. These VANC data streams comply with SMPTE 291M and SMPTE 334M.

The TES-8643 is also capable of extracting VANC data from its video input signal. This allows it to forward the data to other systems, and combine locally generated data with that already carried in the input.

You can also use the TES-8643 to encode SMPTE 104 messages into VANC in accordance with SMPTE 2010-2008. The SMPTE messages can be source from either the serial port or a TCP/IP connection. In addition to sourcing from a port, the GPIs can be configured to trigger up to 8 pre-determined triggers.

These facilities allow the TES-8643 to perform a number of functions:

- Inserting data received from one or more of the data ports into the video. This is normally called “encoding”, “inserting” or “embedding”.
- Extracting data from the video and forwarding it to one or more data ports. This is normally called “decoding”, “extracting” or “disembedding”.
- Deleting selected data from the video.

Features

The following features are standard on the TES-8643:

- Accepts 1080p, 1080i, 720p, 480i, and 576i
- Simultaneous use of data input and output over LAN, and Serial
- Bypass relay protection
- Bypass relay is controllable in DashBoard
- Ample status for easy signal troubleshooting
- Reports status and configuration remotely via DashBoard
- Compatible with DataSafe
- Fully compliant with openGear specifications
- 5-year transferable warranty

ANC Encoding and Decoding Features

- VANC insertion and extraction as per SMPTE 334M
- Supports four encode data services, plus four transparent decode data services, and one SCTE 104 encode/decode service
- Ability to append a data service to others that are already present in a line, without delaying the existing services
- Multiple packet per line VANC encoding/insertion at megabit rates
- Ability to locate incoming VANC packets by DID-SDID, regardless of their line number
- Ability to mark existing packets for deletion
- Deletion of all VANC on selected lines

SCTE 104 Messages Encoding and Decoding

- Identifies the occurrence of an SCTE 104 trigger, either by recognizing the splice-insert commands or simply by detecting the present of the trigger Program ID (PID)
- Monitor up to 8 selected PIDs and associate them with eight GPIO outputs, allowing you to monitor multiple services with one TES-8643 card
- Can be set to match on specific values of the `splice_insert_ID` code in addition to the PID, for additional flexibility
- Each GPIO can indicate either the presence or absence of the a specified PID
- Each GPIO output can be specified to either close for the full duration of a trigger, or pulse briefly to indicate the start or end of a trigger
- An on-board log of the last 24 trigger events can be browsed from DashBoard

Functional Block Diagram

Figure 1.1 shows the flow of video and data through the TES-8643. This shows that a channel is equipped with a VANC decoder that provides extracted data to the CPU, and a VANC encoder that accepts data from the CPU for insertion into the video. The CPU also has access to a serial and Ethernet data port.

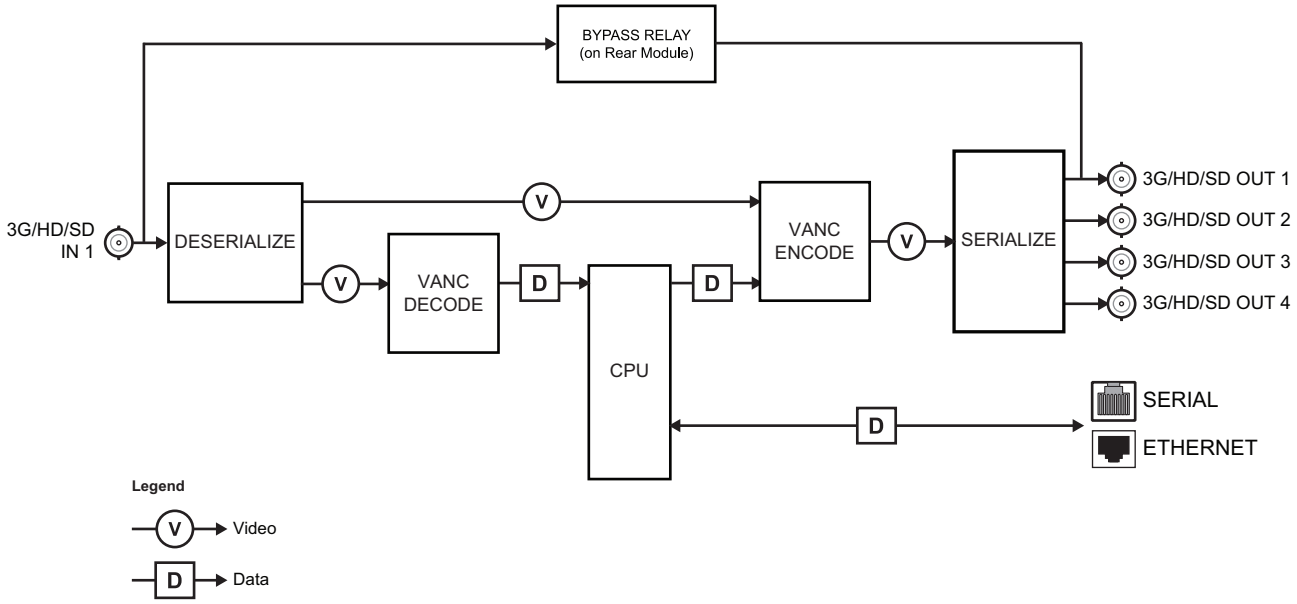


Figure 1.1 *TES-8643 — Simplified Block Diagram*

Workflow Overview

The VANC Processor is able to simultaneously insert and extract four data streams. Decode and encode operation and bandwidth usage are independent. Bandwidth for each is limited to just under 4kB/field including overhead (approximately 2Mbps of user data with maximum size packets at 60Hz). These eight data streams may be delivered via the network connection (**Ethernet** port) or one may be through the **Serial** port.

Transparent Encoding

The VANC Processor of the TES-8643 allows insertion in any line and luma/chroma[1] component of the VANC space that is defined for the video format (but not outside the VANC area). You can assign each data service to any valid line and component, including having any or all services share a single line and component. The VANC Processor allows you to specify whether to insert locally sourced data services after existing VANC data (append), or completely blank the line before inserting (overwrite).

Delay

Locally sourced data appears in the output stream with up to a one field delay. The upstream VANC data in the SDI input that are not processed, or that are simply marked for deletion, have a minimal delay equal to the SDI path length of the TES-8643.

Encode Overflow

If a line is not marked for deletion, then locally appended data may overflow the line. In this case the locally appended data will be appended in the next available VANC space. Additionally, a high capacity stream may exceed the space available in a single line, so again it is inserted in the next available VANC space. High capacity data should always be inserted on lines after other data services. We recommend >5lines after the switch-line.

VANC Deletion

The VANC Processor is able to ‘mark for deletion’ all incoming VANC packets having the same DID/SDID as services that are being inserted, regardless of their location in the VANC lines. This feature is automatically enabled for each DID/SDID used for insertion, to ensure that the output does not contain an unintended combination of upstream and locally inserted data bearing the same DID/SDID. The software has the ability to disable deletion for selected services, for example to allow an upstream data service to pass through when local insertion is paused.

Note — *If an incoming service is carried in a line that is set for deletion, it will be deleted rather than just marked for deletion.*

Transparent Decoding

You can specify services to be decoded and forwarded to a data port (Serial or Ethernet), by specifying the DID and SDID values. The TES-8643 finds and decodes these services, regardless of the line and luma/chroma component where they are carried in the SDI input.

1. Channel separation is only valid in HD and 3G signals. SD combines the luma and chroma components to form a single channel.

User Interfaces

The TES-8643 includes the following user interfaces.

DashBoard Control System

The DashBoard Control System enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with cards in the openGear frame through the Network Controller Card. This controller card is required in order to use DashBoard to monitor the TES-8643. The DashBoard software and manual are available for download from our website

Note — *Ross Video recommends using the MFC-8320-N or the MFC-8322-N Network Controller Card for optimal performance especially when multiple TES-8643 are installed in one frame. An MFC-8320-S Controller Card can be used, but you may encounter delays in updating settings in DashBoard and upgrading the card software.*

For More Information on...

- setting up and using the Network Controller Card, refer to the ***MFC-8300 Series User Manual***.
- the TES-8643 menus in DashBoard, refer to "**Appendix B. DashBoard Menus**" on page 8-1.

Card-edge Controls

The front-edge of the card features LED indicators for input status and communication activity. The card also includes a 3-position jumper block used to configure the termination on the local reference input.

For More Information on...

- the card-edge controls, refer to the section "**Card Overview**" on page 2-3.
- the LEDs, refer to the section "**Card-edge LEDs**" on page 2-4.

SNMP Monitoring and Control

The Network Controller card in the openGear frame provides optional support for remote monitoring of your frame and the TES-8643 using Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring and control tools.

For More Information on...

- enabling SNMP Monitoring and Control for your frame, refer to the ***MFC-8300 Series User Manual***.
- SNMP controls for your card, refer to its Management Information Base (MIB) file.

Documentation Terms and Conventions

The following terms and conventions are used throughout this manual.

Terms

The following terms are used:

- "**Board**" and "**Card**" refer to openGear terminal devices within openGear frames, including all components and switches.
- "**CDP**" refers to Caption Distribution Packets.
- "**DashBoard**" refers to the DashBoard Control System.
- "**DID**" refers to Data Identification.
- "**DTVCC captions**" refer to CEA-708 captions.
- "**Frame**" refers to openGear frame that houses openGear cards.
- "**GPIO**" refers to the DC signals used by one device to control another (General Purpose Input-Output).
- "**Input 1**" refers to IN 1 on the rear module.
- "**LAN**" refers to a local area network.
- "**openGear frame**" refers to all versions of the DFR-8321 series and OG3-FR series and any available options unless otherwise noted.
- "**Operator**" and "**User**" refer to the person who uses the TES-8643.
- "**SDID**" refers to Secondary Data Identification.
- "**SDP**" refers to Subtitle Distribution Packets.
- "**System**" and "**Video system**" refer to the mix of interconnected production and terminal equipment in your environment.
- "**VANC space**" is defined to start at the beginning of Line 1[1]. It extends until the end of the last line of the vertical interval (which depends on the video format).

Conventions

The following conventions are used:

- The "**Operating Tips**" and "**Note**" boxes are used throughout this manual to provide additional user information.

1. The recommended VANC space starts at the second line after the switching line.

Physical Installation

In This Chapter

This chapter provides instructions for the basic physical installation of your TES-8643.

The following topics are discussed:

- Before You Begin
- Card Overview
- Installing the TES-8643
- Cabling Overview
- Ethernet Port Cabling
- Serial Cabling

Before You Begin

Before you begin, ensure that you are using DashBoard version 6.1.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.

Static Discharge

Throughout this chapter, please heed the following cautionary note:

ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking

Unpack each card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Card Overview

This section provides an overview of the controls available on the TES-8643. (**Figure 2.1**)

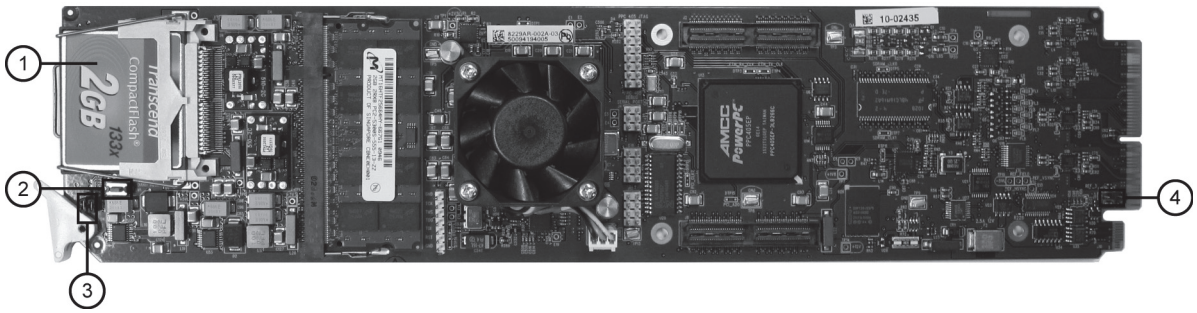


***Figure 2.1** Components*

1) CompactFlash™ Card	3) JP5, JP6
2) Board Reset Button (SW1)	4) Reference Termination (JP7)

1. CompactFlash™ Card

The CompactFlash™ card is not implemented on the TES-8643.

2. Board Reset Button (SW1)

Pressing this button resets the microprocessor and re-initializes the card. This is a hard reset of the card and unsaved settings are not retained. This may cause loss of data and should only be performed as advised by Ross Video Technical Support.

3. JP5, JP6

These jumpers are not yet implemented and must be left in the default position of **Pin 2** (center) and **Pin 3** (bottom).

4. Reference Termination (JP7)

JP7 is a 3-position jumper block used to configure the 75ohm termination on the local reference input on **BNC 9**.

- **Pin 1** (left) + **Pin 2** (center) position — In this position, the reference is terminated with a 75ohm resistor. This configuration is to be used for point-to-point cabling, or on the last card of a daisy chain topology. This is the default position. Refer to **Figure 2.2** for pin positions.

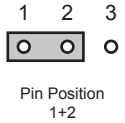


***Figure 2.2** J7 — Default Position*

- **Pin 2** (center) + **Pin 3** (right) position — In this position, the 75ohm termination is removed and the reference is not terminated. This configuration is used in a daisy chain cabling topology where only the last card is to be terminated.

Card-edge LEDs

This section describes the card-edge LEDs. Refer to **Figure 2.3** for LED locations.

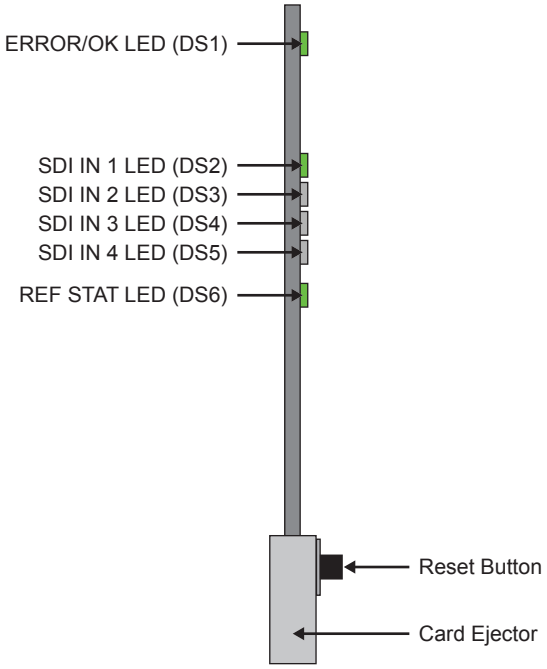


***Figure 2.3** Card-edge LEDs*

Table 2.1 LEDs on the Card-edge

LED	Color	Display and Description
ERROR/OK	Green	When this LED is green, the card is in normal operation with no errors.
	Red	When this LED is red, the card is experiencing internal errors.
	Off	When this LED is off, there is no power to the card.
SDI IN 1	Green	When this LED is green, the IN 1 video input is valid.
	Red	When this LED is red, the IN 1 input is not present or is invalid.
SDI IN 2	This LED is not implemented.	
SDI IN 3	This LED is not implemented.	
SDI IN 4	This LED is not implemented.	
REF STAT	Green	When this LED is green, the reference signal is valid.
	Red	When this LED is red, the reference signal is not present or is invalid.

Installing the TES-8643

This section provides a brief overview of the physical installation of the TES-8643 which includes installing the rear module and the card into an openGear frame. If the rear module and card are already installed, proceed to the section "**Cabling Overview**" on page 2-7.

Supported Rear Modules

Note that each rear module accommodates one card and occupies four slots in the frame. For cabling designations, refer to the section "**Cabling Overview**" on page 2-7. The following rear modules are supported:

- **8320AR-055** Full Rear Module — This rear module provides one SDI input, four SDI outputs, a reference input, a serial port, and an ethernet port. The 8320AR-055 also includes a bypass relay between **IN 1** and **OUT 1**.

For More Information on...

- the bypass relay, refer to the section "**Bypass Relay**" on page 2-8.

Installing the Card

If the rear module is already installed, proceed to the section "**To install the card in an openGear frame**".

To install the rear module in an openGear frame

1. Ensure that the openGear frame is properly installed. Refer to the manual for your frame for details.
2. When installing the rear module, use one of the following slot combinations:
   - Slots 1, 2, 3, 4
   - Slots 5, 6, 7, 8
   - Slots 9, 10, 11, 12
   - Slots 13, 14, 15, 16
   - Slots 17, 18, 19, 20
3. Remove the Blank Plates from the rear of the selected card frame slots. You will need to remove two blank plates for each rear module.
4. Seat the bottom of the rear module in the seating slot at the base of the frame's backplane.
5. Align the top hole of the rear module with the screw hole on the top-edge of the frame backplane.
6. Verify that the card aligns with the rear module before fully tightening any of the slot screws.
7. Using a Phillips screwdriver and the supplied screw, fasten the rear module to the backplane. Do not over tighten.
8. Ensure proper frame cooling and ventilation by having all rear frame slots covered with rear modules or Blank Plates.

To install the card in an openGear frame

1. Install the card in slot 2, 6, 10, 14, or 18. The slot number is dependent on the slot combinations you installed the rear module in. This allows adequate spacing to avoid damaging the card, the cards installed in the neighboring slots, or both.
2. Hold the card by the edges and carefully align the card edges with the rails in the frame.
3. Fully insert the card into the frame until the card is properly seated in the rear module.
4. Verify whether your rear module label is self-adhesive by checking the back of the label for a thin wax sheet. Remove the wax sheet before applying the label.
5. Affix the supplied rear module label to the rear module face.

Cabling Overview

This section outlines the cabling designations for the TES-8643.

For More Information on...

- on GPI cabling, refer to the section "**GPI Cabling**" on page 2-13.
- equalization specifications when using Belden 1694A or equivalent coaxial cable for SDI connections, refer to "**Appendix D. Specifications**" on page 10-1.
- configuring your video input and outputs in DashBoard, refer to the section "**Configuring the Video Outputs**" on page 3-5.

8320AR-055 Cabling

Figure 2.4, and the rear module label, summarize the cabling designations for the 8320AR-055.

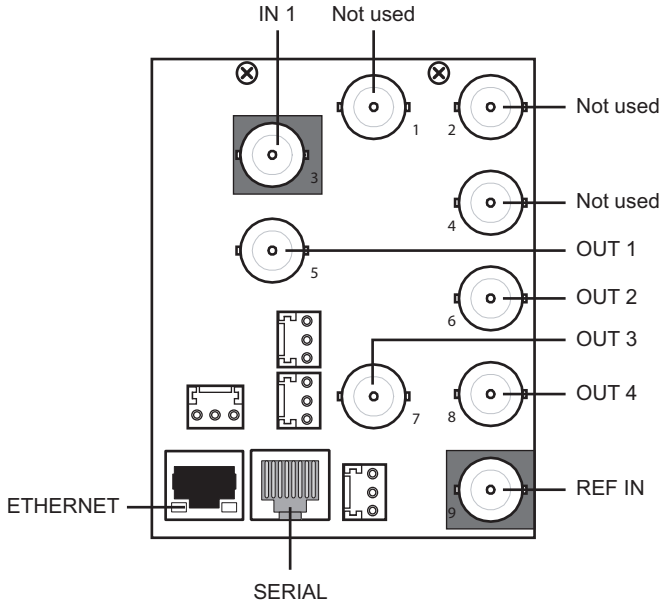


***Figure 2.4** Cable Connections for the 8320AR-055*

Overview

This section briefly outlines the steps to cable the TES-8643 as an encoder or as a receiver.

To install the TES-8643 as an encoder

If you plan to use the TES-8643 as an encoder, proceed as follows:

1. Connect the equipment providing the video signal source to the **IN 1** connector on the TES-8643 rear module.
2. Connect the **OUT 1** connector on the TES-8643 rear module to the equipment that is to receive the video signal with the inserted VANC data.
3. If you are using a serial data connection, connect the transmit computer to the **Serial** port on the rear module.

4. If you are you are using a LAN connection, connect the transmit computer to the **Ethernet** port on the TES-8643 rear module via an Ethernet LAN, using a standard RJ45 cable.

To install the TES-8643 as a receiver

1. Connect the equipment providing the video signal containing the VANC data to be received to the TES-8643 **IN 1** connector on the encoder.
2. Connect the TES-8643 **OUT 1** connector to other equipment that needs this video signal. It is recommended that the output be terminated in 75ohm.
3. If you are using a serial data connection, connect the receive computer to the **Serial** port on the TES-8643 rear module.
4. If you are using a LAN connection, connect the receive computer to the **Ethernet** port on the TES-8643 rear module via an Ethernet LAN, using a standard RJ45 cable.

Cabling a Reference Source

A video reference can be supplied to the TES-8643, either through the local reference input on the rear module, or one of the reference inputs on the openGear frame. However, Ross Video recommends using the SDI input as the reference source.

To cable the reference source for your TES-8643

1. If you wish to use the frame reference input, connect the reference input to the **REF 1** or **REF 2** connector on the openGear frame.
2. If you wish to use an local reference input, connect the analog reference input source to the **REF IN** connector on your TES-8643 rear module.
3. If you wish to use the SDI input as the reference source, connect the reference input to **IN 1** on the rear module. Refer to **Figure 2.4** for connector location.
4. If you are using the local reference input on the rear module, you must also configure **J7** on the card-edge. Choose from the following:
   - **Pin 1** (left) + **Pin 2** (center) position — In this position, the reference is terminated with an 75ohm resistor. This configuration is to be used for point-to-point cabling, or on the last card of a daisy chain topology. This is the default position. (**Figure 2.2**)
   - **Pin 2** (center) + **Pin 3** (right) position — In this position, the 75ohm terminator is removed and the reference is not terminated. This configuration is used in a daisy chain cabling topology where only the last card is to be terminated.

For More Information on...

- configuring your reference source in DashBoard, refer to the section "**Selecting the Timing Source**" on page 3-4.

Bypass Relay

There is a bypass relay from the **IN 1** to **OUT 1** on the 8320AR-055 rear module. The purpose of this relay is as follows:

- When the card is removed from the frame, the relay passes video from the IN 1 to OUT 1 of the card. This allows the card to be serviced with minimum interruption to the video signal.

- If the card loses power, or the frame loses power, the video still passes through.
- When the card boots, the relay will be left in Bypass mode until the card can generate a valid output. Once the card is functional, the relay is disabled if the bypass is also disabled in the **Config** tab of DashBoard.
- You can also put the card into Bypass mode by toggling the **Video State** button in the **Video** sub-tab of the **Config** tab.

Ethernet Port Cabling

The **Ethernet** port on the rear module is an RJ-45 jack for Ethernet connection to a local area network. This port is used to stream VANC decode/encode data, connect to an Ethernet network for communications, and software upgrades using DashBoard.

This section presents a general overview of the Ethernet connection process. The exact steps for connecting your card to your facility via an Ethernet network depend on the network requirements of your facility. Note that in addition to the **Ethernet** port on the rear module, you must also provide an Ethernet connection to the openGear frame as outlined in the manual that accompanied your frame. The Ethernet connection on the frame is used for communications, software upgrades using DashBoard, and as the time source for the SCTE 104 event log.

For More Information on...

- set up of Ethernet connections between the Comtrol® DeviceMaster® and the TES-8643, refer to the chapter "**Appendix A. Using a Port Expander**" on page 7-1.

Ethernet Cabling for the TES-8643

Contact your IT Department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for the TES-8643.

You will require a standard network CAT-5 cable to connect the TES-8643 to your facility network. (**Figure 2.5**) There is no need for a crossover cable as the TES-8643 includes an Auto-MDIX Ethernet PHY that will switch from straight to crossover automatically as needed. Ross Video does not supply these cables.

The **Ethernet** port uses a standard pinout, which means that it is intended to be connected to a router or switch using a standard cable.

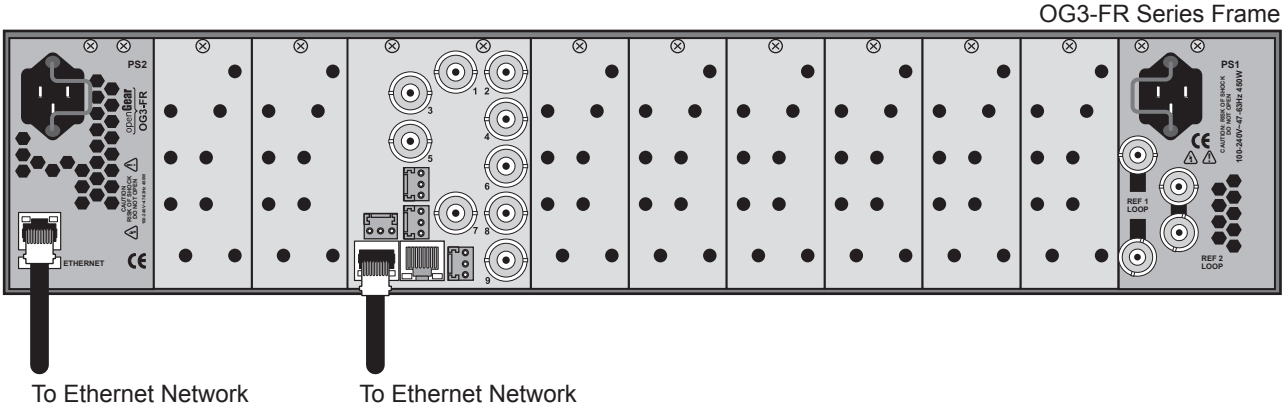


***Figure 2.5** TES-8643 — Ethernet Connection*

For More Information on...

- configuring the Ethernet communications for the TES-8643, refer to the section "**Ethernet Communication Setup**" on page 3-3.

Serial Cabling

The **Serial** port on the rear module is used for data transfer between the TES-8643 and other equipment. When connecting to an external device, such as a PC that is wired as Data Terminal Equipment (DTE), you need to use a null modem cable. When connecting to an external device that is wired as Data Communications Equipment (DCE), such as a modem, you need to use a "straight-through" 9-pin cable instead of the null-modem.

Cabling for the Serial Port

You will need a cable with an RJ-45 connector on one end (connects to the **Serial** port on the TES-8643 rear module). Refer to the manual for your device for specific pinout information and the required port to use. Refer to **Table 2.2** for cabling details.

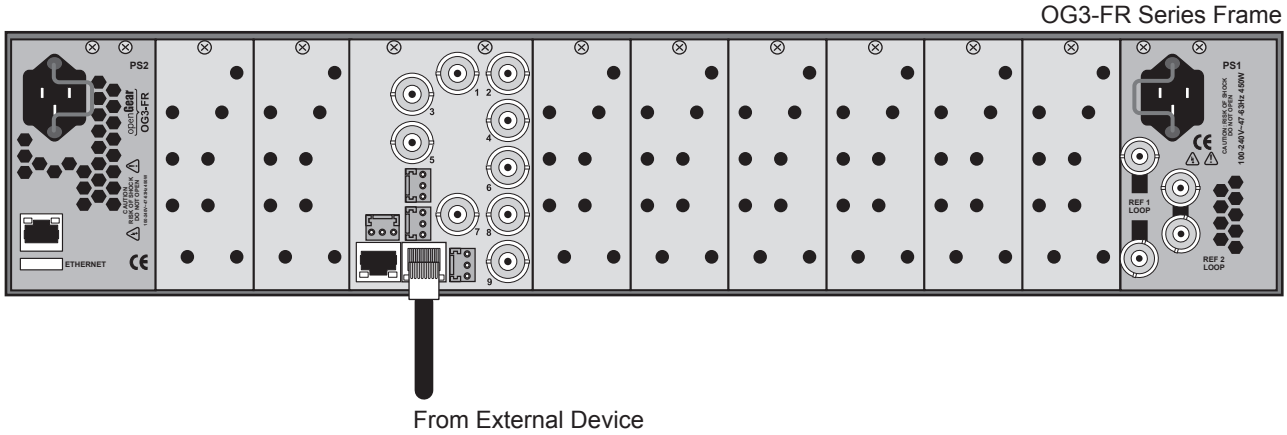


***Figure 2.6** TES-8643 — Serial Connection*

Serial Port Pin Assignment

When building cables to interface to the TES-8643 **Serial** port, it is recommended to use CAT-5 or CAT-5e cable with the standard wiring color coding. Ross Video does not supply this cable. **Figure 2.7** illustrates the male connector to insert into the **Serial** port of the rear module.

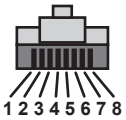


***Figure 2.7** 8320AR-055 Rear Module to Serial Device Connector*

Table 2.2 provides the pin assignment of the **Serial** port on the rear module.

Table 2.2 RJ-45 Pin Assignment

RJ45 Pin	RS-232	RS-422	RS-422 Null
1	n/c	Tx+	Rx+
2	Rx	Tx-	Rx-
3	Tx	Rx+	Tx+

Table 2.2 RJ-45 Pin Assignment

RJ45 Pin	RS-232	RS-422	RS-422 Null
4	n/c	n/c	n/c
5	n/c	n/c	n/c
6	n/c	Rx-	Tx-
7	GND	GND	GND
8	GND	GND	GND

GPI Cabling

The TES-8643 provides up to eight General Purpose Input (GPI) and Tally pins to interface with external equipment. The number of GPI/Tallies available depends on the rear module type and the card model you are using.

The GPI ports are available on 3-pin WECO™ connectors located on the rear module. The 3-pin mating connectors are provided with the rear module.

The default state for the GPI/O contacts is active low signaling. This way, if the card is removed from the openGear frame, no external events will be inadvertently asserted by the card. This also means that if a GPI cable is absent from the rear module, no GPI or Tally will be triggered and executed inadvertently by the card.

Ports are user programmable to be either an input (GPI) or an output (Tally). Electrically, the ports are set up for contact closure to ground, with 4.75Kohm pull-up resistor to +5V, so they default to a logical high state.

For More Information on...

- configuring GPIs for triggering SCTE 104 messages, refer to the section "**Setting up GPI/Tally Communications**" on page 5-5.

GPI/Tally Cabling

GPI/Tallies can be used to remotely control the operation of the TES-8643 by means of contact closures. VANC services (SCTE 104 triggers) can be enabled or disabled on one or more of these inputs. This section summarizes the GPI/Tally cabling for the TES-8643 based on the rear module type.

The 8320AR-055 rear module provides up to eight GPI and Tally pins to interface with external equipment. (**Figure 2.8**)

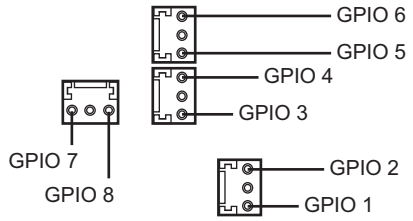


***Figure 2.8** 8320AR-055 GPI Connections*

Basic Configuration

In This Chapter

This chapter provides instructions for configuring the TES-8643 using the options available in the DashBoard Control System.

The following topics are discussed:

- Using DashBoard
- Ethernet Communication Setup
- Selecting the Timing Source
- Configuring the Video Outputs
- Personality Options
- Software Upgrades
- Loading the Factory Defaults
- Using DataSafe

Using DashBoard

Before proceeding, ensure that DashBoard software version 6.1.0 or higher is installed on a PC connected to your facility network. The DashBoard software and user manual are available from the Ross Video website.

For More Information on...

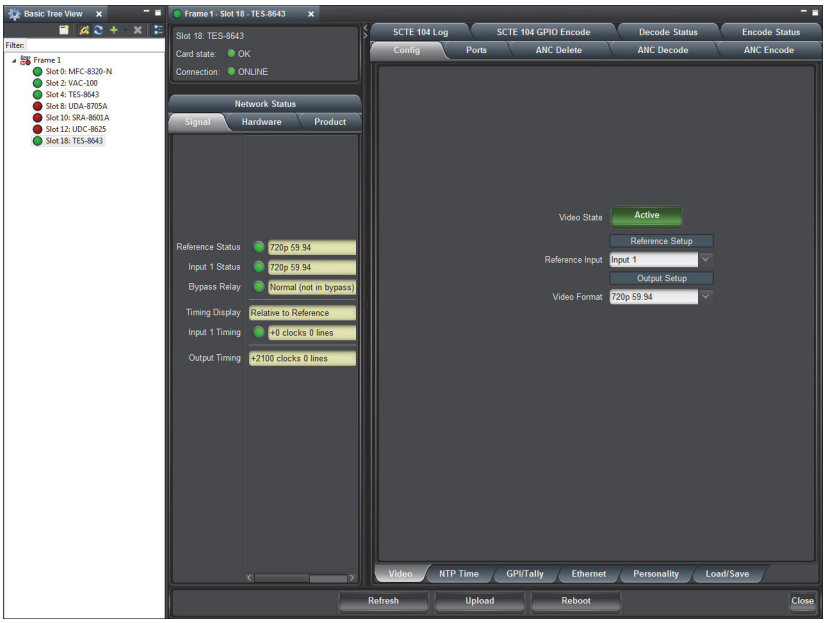
- using DashBoard, refer to the ***DashBoard User Manual***.

To launch DashBoard

1. Ensure that you are running DashBoard software version 6.1.0 or higher.
2. Launch DashBoard by double-clicking its icon on your desktop.
3. Ensure that the openGear frame with the TES-8643 card(s) is displayed in the Tree View located on the left-side of the DashBoard window. It may take 30 seconds or more to update the Tree View. Consult the ***MFC-8300 Series User Manual*** and ***DashBoard User Manual*** should the Tree View not display the TES-8643 node.

To access a card in DashBoard

1. From the **Tree View**, expand the node for the openGear frame your cards are installed in. A list of cards installed in the frame is now displayed. In the example below, the node for Frame 1 is expanded to show a list of six cards including two TES-8643 cards.
2. Double-click the node for a card to display its menus in the **Device View** of DashBoard (right-side of the DashBoard window).



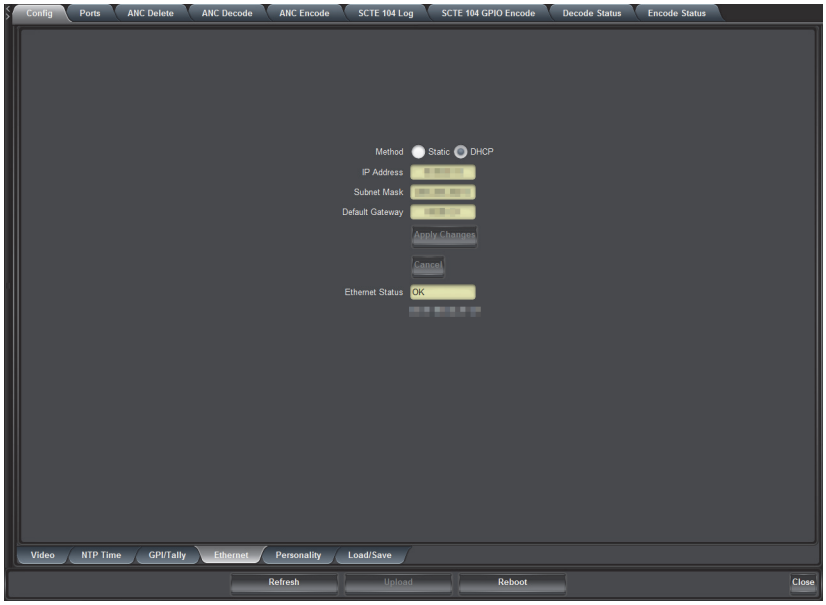
Example of a TES-8643 in DashBoard

Ethernet Communication Setup

The **Ethernet** port on the rear module is used to stream VANC decode/encode data, connect to an ethernet network for communications, and software upgrades using DashBoard. To use the rear module ethernet port, the card must be configured with valid ethernet settings. The settings can be specified manually (**Static**) or may be obtained automatically from a server on your network (**DHCP**).

To set up ethernet communications for the card

1. From the **Device View**, select the **Config** tab.
2. Select the **Ethernet** tab located at the bottom of the **Config** tab.



Config Tab — Ethernet Tab

3. To obtain network settings automatically, select **DHCP** from the **Method** area.
4. To manually configure the ethernet settings:
   - Select **Static** from the **Method** area.
   - Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** settings for the card.
5. Click **Apply Changes** to save the new settings. Click **Cancel** to revert to the previous settings.

Note — *The **Ethernet Status** field in the **Network** tab displays the current status of your connection. Refer to **Table 8.8** on page 8-7 for a list of the messages.*

Selecting the Timing Source

The openGear frames support a distributed frame reference, allowing incoming reference signals to feed timing information to all cards in that frame. Thus, a single composite or tri-level sync signal can be used for multiple TES-8643 cards. Alternatively, each card accepts a reference signal on the rear module to provide additional system timing flexibility.

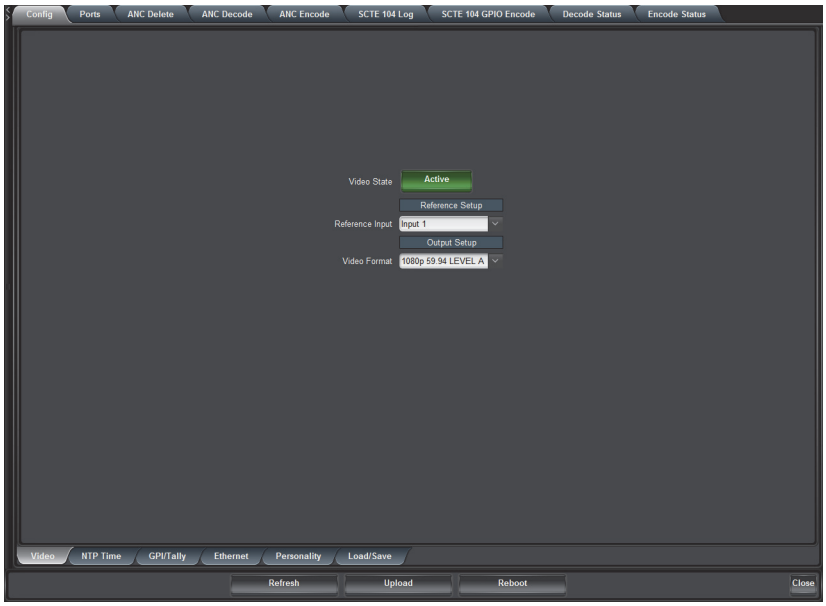
The TES-8643 requires a reference input at the same frame rate as the SDI input. You must supply and select a reference signal. This section provides information for specifying the reference source for your card.

For More Information on...

- cabling the reference source for your card, refer to the section "**Cabling a Reference Source**" on page 2-8.
- configuring how the input signal timing is reported by DashBoard, refer to the section "**To configure the input signal timing for your card**" on page 3-6.
- monitoring the reference status, refer to the section "**Signal Tab**" on page 8-2.

To select the reference source for the card

1. From the **Device View** in DashBoard, select the **Config** tab.
2. Select the **Video** tab located at the bottom of the **Config** tab.



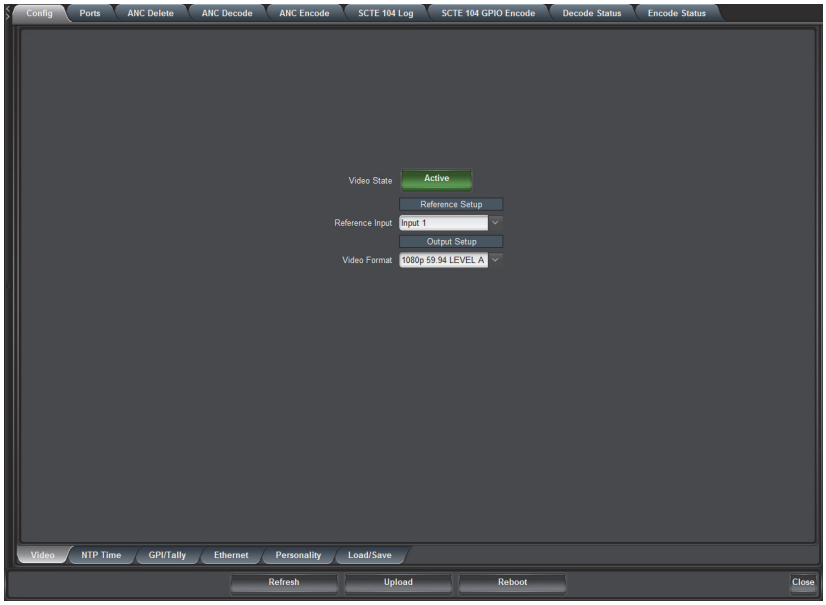
Config Tab — Video Tab

3. Select a reference input from the **Reference Input** menu. Refer to **Table 8.5** on page 8-5 for a list of options.

Configuring the Video Outputs

Use the following procedure to configure your video outputs on the card:

1. From the **Device View** in DashBoard, select the **Config** tab.
2. Select the **Video** tab located at the bottom of the **Config** tab.



Config Tab — Output Setup Area

3. From the **Video Format** menu, specify the video format for the card input and outputs. This must be compatible with the selected reference. Refer to **Table 8.5** on page 8-5 for a list of available formats.

Note — *The output timing delay is fixed at half a line from the reference source.*

For More Information on...

- input status fields in the **Signal** tab, refer to the section "**Signal Tab**" on page 8-2.

Personality Options

This section outlines how to configure the options available in the **Personality** tab.

For More Information on...

- on configuring the TES-8643 for encoding or decoding SCTE 104 messages, refer to the section "**Selecting a Mode**" on page 5-3.

Configuring the Input Signal Timing Display

The **Timing Display** feature enables you to configure how the input signal timing is reported by DashBoard. This information is displayed in the individual **Input Timing** fields of the **Signal** tab. The timing display reports the delay of the input signals in output format clocks and lines.

To configure the input signal timing for your card

1. From the **Device View** in DashBoard, select the **Config** tab.
2. Select the **Personality** tab located at the bottom of the **Config** tab.
3. Configure how the signal timing by selecting one of the following options from the **Timing Display** menu.
   - **Relative to Reference** — Select this option to display the timing offset values of the SDI inputs relative to the selected reference as follows:
     - › A negative offset value indicates that the SDI signal is earlier than the reference.
     - › A positive value indicates that the SDI signal is later than the reference.
   - **Input to Output** — Select this option to display the timing offset values of the SDI inputs relative to the SDI output of the card as follows:
     - › A negative offset value indicates that the IN signal is earlier than the OUT signal.
     - › A positive value indicates that the IN signal is later than the OUT signal.

Configuring the Edit Permissions

The **Personality** tab in DashBoard enables you to lock the card permissions so that parameters are read-only and cannot be changed.

To configure the card edit permissions

1. From the **Device View**, select the **Config** tab.
2. Select the **Personality** tab located at the bottom of the **Config** tab.
3. Configure the edit permission by choosing an option from the **Edit Permission** menu. Refer to **Table 8.9** on page 8-8 for a list of options.

Software Upgrades

The TES-8643 can be upgraded in the field via the **Ethernet** port on the rear module, or via the MFC-8300 Series Network Controller card in your frame. The instructions in this section are applicable to both methods. Note that DashBoard version 6.1.0 or higher is required for this procedure.

Important — *Ross Video recommends that you connect and configure the Ethernet on the rear module before upgrading. Without this connection, the upgrade process can take several minutes especially when upgrading multiple cards. Refer to the section "**Ethernet Port Cabling**" on page 2-10 for setup details.*

To upgrade the software on a card

1. Contact Ross Technical Support for the latest software version file.
2. If you are upgrading via the **Ethernet** port on the rear module:
   - Ensure the Ethernet cable is properly connected to the **Ethernet** port. Refer to the section "**Ethernet Port Cabling**" on page 2-10 for details.
   - Verify that the **Ethernet Status** field in the **Network** tab displays **OK**. Note that if an error is reported in this field, the upgrade is automatically performed via the MFC-8300 Series Network Controller card and upgrade times may be affected.
3. Display the **Device View** of the card by double-clicking its status indicator in the **Basic Tree View**.
4. From the **Device View**, click **Upload** to display the **Select file for upload** dialog.
5. Navigate to the ***.bin** upload file you wish to upload.
6. Click **Open**.
7. If you are upgrading a single card, click **Finish** to display the **Uploading to Selected Devices** dialog. Proceed to step 9.
8. If you are upgrading multiple cards:
   - Click **Next >** to display the **Select Destination** menu. This menu provides a list of the compatible cards based on the card selected in step 3.
   - Specify the card(s) to upload the file to by selecting the check box(es) for the cards you wish to upload the file to.
   - Verify that the card(s) you wish to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
   - Click **Finish** to display the **Uploading to Selected Devices** dialog.
9. Monitor the upgrade.
   - The **Uploading to Selected Devices** dialog enables you to monitor the upgrade process.
   - Notice that each card is listed in the dialog with a button. This button is replaced with a **Reboot** button once the software file is loaded to that card.

Important — *Avoid clicking the individual **Reboot** buttons until all cards have successfully completed the file upload process and the **OK** button, located in the bottom right corner of the dialog, is enabled.*

   - Click **OK** to re-boot all the cards listed in the **Uploading to Selected Devices** dialog.

- The **Reboot Confirm** dialog displays, indicating the number of cards that will re-boot. Click **Yes** to continue the upgrade process. Note that clicking **Cancel** or **No** returns you to the **Uploading to Selected Devices** dialog without rebooting the card(s).
- The card(s) are temporarily taken offline during the re-boot process. The process is complete once the status indicators for the **Card State** and **Connection** fields return to their previous status.

Troubleshooting

If you encounter problems when upgrading your card software, verify the following:

- Your network settings on the card are valid. Refer to the section "**Ethernet Tab**" on page 8-7 for a list of available settings.
- The ethernet cable is properly connected if you are uploading the file via a network connection.
- The file you are attempting to load is a ***.bin** file that is for the card you are upgrading.

Loading the Factory Defaults

If required, the card menu parameters can be reset to the factory default values using the option available in the **Load/Save** tab.

Note — *Ethernet settings, reference selection, and the output formats are not reset using this method.*

To reset the card to the factory default configuration in DashBoard

1. From the **Device View**, select the **Config** tab.
2. Select the **Load/Save** tab located at the bottom of the **Config** tab.
3. From the **Global Settings** area, click **Load Factory Defaults** to display the **Confirm** dialog.
4. Click **Yes** to load the factory default values for all menu parameters, or **No** to cancel the load and close the dialog.

Using DataSafe

DataSafe enables you to load and store card parameters automatically, or you can load from and store to a single file in DashBoard. Ensure that you are loading parameters to the same model of card. The DataSafe feature is available for openGear frames using the MFC-8320-N cards only. For details on using the DataSafe feature, refer to the ***MFC-8300 Series User Manual*** and the ***DashBoard User Manual***.

However, the following card parameters are not restored/saved using DataSafe:

- Ethernet setup settings

ANC Encoding and Decoding

In This Chapter

The TES-8643 can act as both an ANC encoder and a decoder simultaneously. This chapter outlines how to configure the encoding and decoding features of the TES-8643 in a transparent stream.

The following topics are discussed:

- Encoder Settings Overview
- Encode Mode Overview
- Configuring the TES-8643 for Encoding
- ANC Delete Setup
- Decoder Settings Overview
- Configuring the TES-8643 to Decode
- Assigning Data Ports
- Monitoring the Status via DashBoard

Note — *Before proceeding, ensure that you are running DashBoard software version 6.1.0 or higher. You can download the DashBoard Control System software and manual from the Ross Video website.*

Encoder Settings Overview

The TES-8643 provides the ability to ‘mark for deletion’ all incoming VANC packets having the same DID and SDID as services that are being inserted, regardless of their location in the VANC lines. This feature is enabled by default for each DID/SDID used for insertion, to ensure that the output does not contain an unintended combination of upstream and locally inserted data bearing the same DID and SDID. However, you can disable deletion for selected services, for example to allow an upstream data service to pass through when local insertion is passed.

This section outlines the basic settings available on each **ANC Encode** tab.

Encode Mode

When you select a Encode Mode, the TES-8643 automatically configures and locks the applicable settings on the tab. Refer to the section “**Encode Mode Overview**” on page 4-4 for information on the available Encode Modes to choose from.

DID and SDID

The Data ID and Secondary Data ID specify (in hexadecimal) the values to be used for the corresponding fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M. No matter what Encode Mode is selected the DID and SDID can be changed.

Encode Line

Line Selection allows for the choice of lines to encode into. The line number selection will change with the Encode Mode selection. All packet Encode Modes will insert a single packet on the line indicated. Selecting Byte mode with a data count greater than 255 will result in multiple packets on the selected line.

Note — *Lines earlier than the second line after the switching line are not recommended for insertion. Lines outside the VANC interval are not usable.*

Encode Channel

There are radio buttons for the selection of the chroma or luma channels. Note that channel selection does not apply when using an SD signal as both luma and chroma channels are combined. In such cases, it is recommended to select luma.

Send Field Indicator

When this check box is checked, the Transparent module sends field indicator characters out the **Serial** or **Ethernet** port that it is using to receive data, to allow the transmit computer to synchronize to the video signal. The field indicator is sent just after each vertical interval. For an interlaced signal, the indicator is a '1' (ASCII code 0x31) to indicate field 1, and a '2' (ASCII code 0x32) to indicate field 2. For a non-interlaced (progressive) signal, each field indicator corresponds to the passing of one video frame, and the indicators still alternate between '1' and '2', even though a progressive signal consists of frames, rather than fields.

Upstream VANC Priority

The Upstream VANC Priority options enable you to control the arbitration between incoming VANC (network) data and locally-sourced (local) data for the TES-8643.

Note — *ANC delete takes precedence. If a packet is deleted from a line, then it is not available to the encoder.*

There are three mutually-exclusive options: overwrite upstream, local priority, and upstream priority. You can also define a time out period.

Overwrite

The TES-8643 always marks for deletion packets in the upstream video with matching DID and SDID. This is the default setting.This enables local data to be inserted without interference from unwanted network data. This will also occur even if the local source is disconnected or idle, and can be used for arbitrarily marking packets for deletion.

Local Priority

This option enables local data to be inserted whenever it is available, overwriting any network data. Network data passes through whenever local data has stopped arriving at the assigned port for longer than a defined time out period.

This mode enables the local user to insert transparent data simply by sending it to the TES-8643, and to revert to passing network data by simply stopping the sending of local data to the TES-8643.

Upstream Priority

This option enables network data to pass through whenever it is available, and any local data is discarded. Local data is inserted whenever network is absent for longer than the defined time out period.

When selected, this mode enables the network to control the sharing between network and local data. The network can create an insertion opportunity for local data by pausing transmission of network data.

Timeout (Frames)

Specifies the number of frames the TES-8643 will wait before switching away from the priority item. The range is 1-60 video frames. The default value is 10.

- If the priority source is active, the TES-8643 switches to it.
- If the priority source is not active, the TES-8643 waits the specified time before switching to the secondary source.

Encode Mode Overview

The TES-8643 supports specific Encode Modes, such as Caption CDP, which have define data formats. The TES-8643 can also handle general data which has no specified format. When you select a Encode Mode, the required settings are auto-configured for you on the selected ANC Encoder tab while other settings may be set to read-only.

Disabled

Disables the encoding feature for the specified service.

Caption CDP Mode

The Caption CDP selection is for a source providing data formatted as Caption Distribution Packets (CDPs). This is the type of data used in CEA-708 captioning for HDTV. The setup software will make most of the other settings for you. The source must provide CDP packets correctly timed to the video. That means a CDP must be provided for each frame of the video. The encoder will find the CDP boundaries and buffer the packet until the beginning of the next frame.

Note — *The Caption CDP and Subtitle SDP modes only insert into the first field.*

Subtitle SDP Mode

The Subtitle SDP is for a source providing data as Subtitle Distribution Packets (SDP). This is the type of data used to carry WST subtitling information in an HD signal. The data must be formatted according to OP47. The setup software will make most of the other settings for you. The source must provide SDP correctly timed to the video. That means a SDP must be provided for each frame of the video. The encoder will find the SDP boundaries and buffer the packet until the beginning of the next frame.

Custom Packet Mode

In Custom Packet mode you must make all of your own settings. Normally, one of the other modes will provide the functionality that you require. If not, then Custom Packet mode and a thorough understanding of the settings will allow you to send many different types of data. Custom Packet mode is provided as a way for you to make any settings you desire. This mode is further discussed in the section "**Custom Packet Mode**" on page 4-4.

Note — *This mode will insert packets in both fields unless the source carefully times data transmission for one field using the Field Indicator.*

In Custom Packet mode, the TES-8643 allows packets of data to be formatted by the transmit computer such that each packet will correspond to one VANC packet inserted into the HDTV signal. The packet of data sent to the TES-8643 by the transmit computer must be formatted as follows:

```
{Identifier} {Length} {data} {Footer ID} {Footer data}
```

The components of the packet are as follows:

Table 4.1 Packet Components

Parameter	Description
{Identifier}	A 2byte sequence indicating the start of the packet. This identifier must match the value specified as the Packet Identifier in the Packet Identifier field on the ANC Encoder tab.
{Length}	A 1byte unsigned number indicating the number of bytes in the entire packet, from the first byte of the Identifier to the last byte of the Footer data, inclusive
{data}	A sequence of any 8bit data, maximum number of data bytes is 248 (255-7).
{Footer ID}	One byte with a hexadecimal value of 0x74, indicating the start of the Footer data.
{Footer data}	A 3byte sequence of any 8bit data.

Two applications for this mode are:

- Inserting Caption Distribution Packets (CDPs), carrying DTV Closed Captioning data, as defined by CEA-708.
- Inserting Subtitle Distribution Packets (SDPs), carrying WST teletext data and EST Enhanced Systems Teletext, as defined by SMPTE 334M.

When Custom Packet mode is being used for one of these applications, the values for the various fields must conform to the applicable standard. For any custom applications, however, the transmit computer need only ensure that the fields conform to the format given above.

Byte Mode

Byte mode allows data of undefined format to be inserted into the VANC. The data will normally be inserted into a single packet on a single line and will be inserted as soon as possible. At each insertion opportunity the TES-8643 will take the data accumulated from the source and build it into one or more packets (as defined by the Data Count setting) and insert it. If you try to provide data faster than the rate specified by the Data Count setting, then the TES-8643 will flow control the data source.

In Byte mode, data is encoded as it arrives at the port according to rules which are defined by the settings enabled when Encode mode is set to Byte.

Data Count

Data Count sets the maximum number of bytes that will be sent in a single VANC line for the given field. If the port provides more data than can be inserted, then the data will be buffered until the port is flow controlled. Flow control will be used to maintain the specified data rate.

If the port provides less data than allowed on the line, then any completed packets will be sent. If no complete packets have been gathered then no packets will be inserted (unless one of the following flush behaviors is triggered). A VANC packet is full if it contains 255bytes or matches the data count (counts less than 255). If you set the Data Count to a value greater than 255, and the data source provides more than 255bytes per field interval, the TES-8643 will insert a second and subsequent packets as needed. These additional packets are inserted immediately after the first one, in the same line if possible. If they do not all fit in the specified line, the remaining packets are inserted in the next line.

Flush Buffer at VANC

These check boxes modify the operation of the Data Count if the port does not provide enough data to form a packet of the size specified by the Data Count for the field. If one or both of the check boxes are selected, then any data which has been received, at the point when the specified VANC area of the video occurs, will be used to form a packet (with a smaller Data Count if necessary) and will be inserted in the following VANC area.

As an example, assume that only the Field 2 check box is checked, the Data Count is set to 180 bytes, and the baud rate is set to 9600. At this baud rate, a maximum of 32 characters will be received during any 2 field period of a 59.94Hz or 60Hz video signal. If the data is being sent by the transmit computer at the maximum rate, then at each field 2 VANC the data received during the previous 2 fields (usually 32 characters) will be used to form a packet and will be inserted in the following field 1 VANC area.

If a progressive video signal (i.e. 720p or 1080p) is being used, then the Field 2 check box is ignored. If the Field 1 check box is selected in this case, then the buffer is flushed at every VANC area.

Flush Buffer Timeout

This setting specifies an idle timeout. After the specified time, if no new data has been received, then any previously received data will be inserted. This is useful to terminate a transmission as cleanly as possible. Otherwise data may linger in a buffer until data reception resumes.

VANC Header

Normally this field should be cleared. The header is applied to each inserted packet. It may be useful to the application to aid parsing.

Configuring the TES-8643 for Encoding

Control of overwriting upstream data is on a line by line basis and is separate for the chroma and luma channels. It is possible to have different settings for different lines.

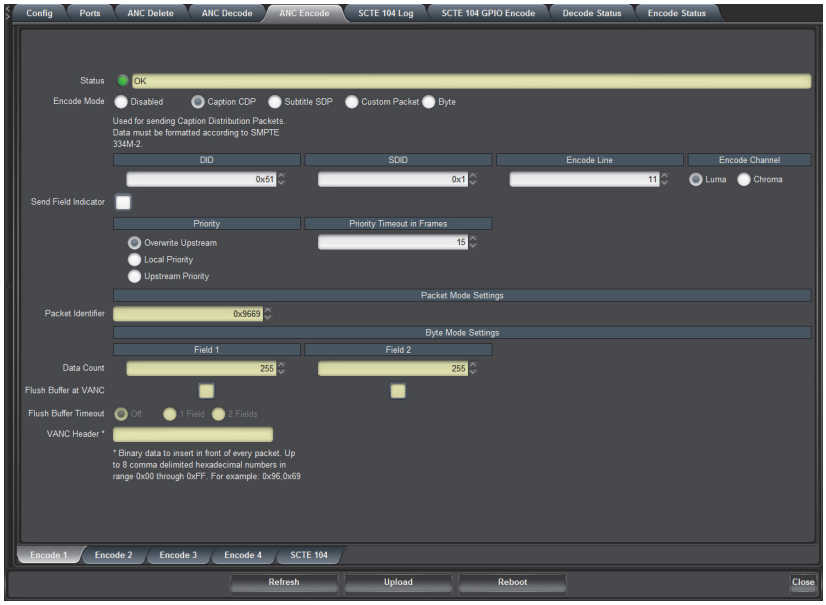
Note — *The encoding feature can only "mark for deletion" packets in VANC. If a packet with matching DID/SDID arrives in HANC, it will pass through unaltered.*

For More Information on...

- the parameters available in the **ANC Encode** tabs, refer to the section "**ANC Encode Menus**" on page 8-15.

To configure the TES-8643 for encoding

1. From the **Device View**, select the required **ANC Encode** tab for the service you wish to configure.
2. Use the **Encode Mode** options to specify the type of encoding for the stream. Refer to the section "**Encoder Settings Overview**" on page 4-2 for details. Depending on the selected mode, some menu items may be read-only.



ANC Encode 1 Tab — Caption CDP Selected

3. Use the **DID** and **SDID** fields to specify the fields in the encoded Ancillary Data Packet.
4. Use the **Encode Line** field to specify which line to encode into.
5. Use the **Encode Channel** options to specify whether to encode the luma or chroma channel. Note that if you are using an SD signal, both channels are encoded regardless of the selection made for the **Encode Channel**.
6. Configure the **Send Field Indicator** as required. Refer to the section "**Send Field Indicator**" on page 4-2 for details on this parameter.
7. If you selected **Byte** as the **Encode Mode**:
   - In the **Data Count field**, specify the maximum number of bytes that will be sent on a single VANC line for the given field.
   - Set the **Flush Buffer at VANC** for each field. Refer to the section "**Flush Buffer at VANC**" on page 4-6 for details on setting this parameter.

- Set the **Flush Buffer Timeout** as follows as outlined in the section "**Flush Buffer Timeout**" on page 4-6.
- In the **VANC Header** field, type a string of hexadecimal bytes to insert at the start of each Byte Mode packet. For example, to insert the two bytes `FA AF` in front of each packet, the string would contain `0xFA 0xAF`. For most applications, this field should be left empty.

8. If you selected **Custom Packet** as the **Encode Mode**, proceed to the section "**Upstream VANC Priority**" on page 4-3.

Configuring the Upstream VANC Priority Settings

Configure the Upstream VANC Priority settings when you wish to easily switch between incoming "network" CEA-708 closed captioning and locally-sourced "local" closed captioning in the VANC space.

To configure the upstream VANC priority

1. From the **Device View**, select the applicable **ANC Encode** tab.
2. In the **VANC Priority** area, select the required priority option. Refer to the section "**Upstream VANC Priority**" on page 4-3 for details.
3. Use the **Timeout in frames** field to specify the number of frames the TES-8643 will wait before switching away form the priority item.

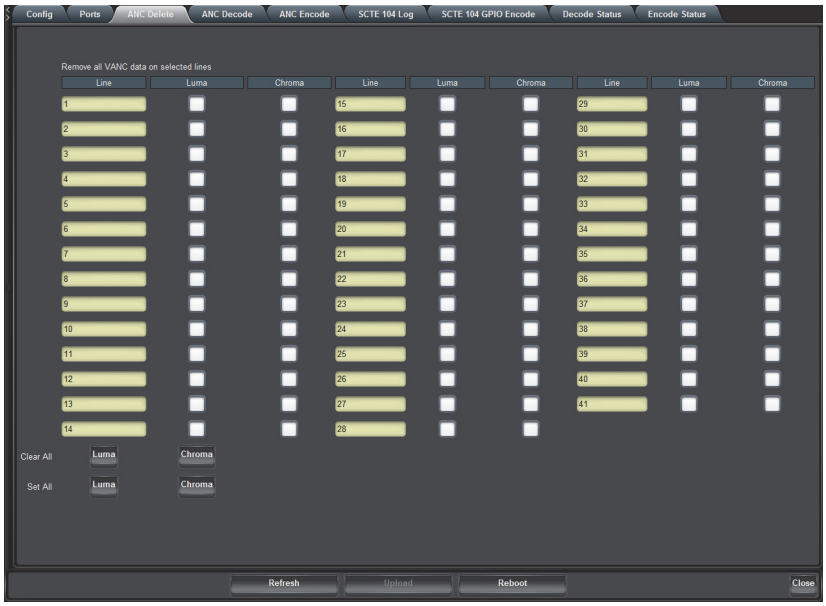
ANC Delete Setup

The TES-8643 is capable of deleting all VANC packets in user-selectable lines in the VANC space. All data on the line in the selected channel is completely deleted.

Note — *This setting supersedes the upstream VANC priority setting. If there is upstream data on the deleted line, it can not be detected by an encoder.*

To specify which lines to remove all VANC data from

1. From the **Device View**, select the **ANC Delete** tab.



ANC Delete Tab

2. Locate the field in the **Line** column that represents the line that you wish to remove VANC data from. Refer to the section **Table 10.3** on page 10-4 for a list of switch lines and the last VANC lines.
3. Select the required **Luma** check box to remove all VANC packets from the luma channel of the incoming VANC service.
4. Select the required **Chroma** check box to remove all VANC packets from the Chroma channel of the incoming VANC service.

Decoder Settings Overview

The TES-8643 performs transparent decoding. You select the services to be decoded and forwarded to a data port (**Serial** or **Ethernet**) by specifying only their DID and SDID values. The TES-8643 finds and decodes these services, regardless of the line and luma/chroma channel where they are carried in the SDI input.

This section outlines the basic settings available on the **ANC Decode** tab.

DID and SDID

The Data ID and Secondary Data ID specify (in hexadecimal) the values to be used for the corresponding fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M.

Send Field Indicator

When this check box is checked, the TES-8643 sends field indicator characters out the **Serial** or **Ethernet** port that it is using for decoded data, in order to allow the receive computer to synchronize to the video signal. The field indicator is sent just after each vertical interval. For an interlaced signal, the indicator is a '1' (ASCII code 0x31) to indicate field 1, and a '2' (ASCII code 0x32) to indicate field 2. For a non-interlaced (progressive) signal, each field indicator corresponds to the passing of one video frame, and the indicators still alternate between '1' and '2', even though a progressive signal consists of frames, rather than fields.

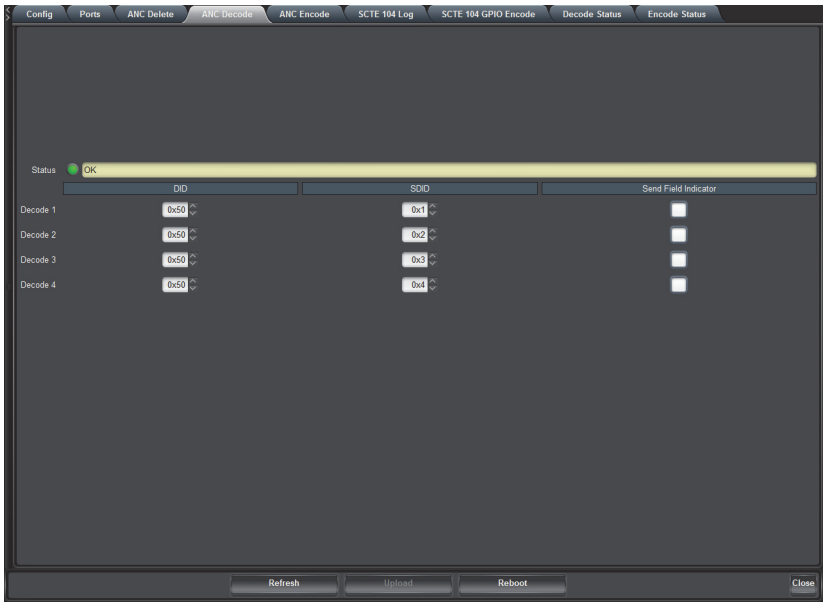
For most applications, the output data is expected to be the same as that which arrived at an upstream encoder; for this reason, the Send Field Indicator check box should be left clear (unselected) unless you know that the receiving device needs the field indicator for proper operation.

Configuring the TES-8643 to Decode

If the DID and SDID match a packet, then the contents are captured and made available at the data port selected. All data is sent to the data port. If the service is a packet type, then the header and footer data are sent along with the body. It is up to the receive computer to parse the stream to find the packet boundaries. The packet may be found in luma and/or chroma, HANC and/or VANC.

To configure the TES-8643 to decode

1. From the **Tree View**, select the node for the TES-8643 you want to access.
2. Select the **ANC Decode** tab. Each Decode service (Decode 1-4) is listed on the tab, enabling you to configure each service separately.



ANC Decode Tab

3. Use the **DID** and **SDID** fields to specify (in hexadecimal) the values to be used for the corresponding fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M.
4. Select the **Send Field Indicator** check box to enable the TES-8643 to send the field indicator characters out the data port that it is sending decoded data to, to allow the receive computer to synchronize to the video signal. The field indicator is sent just after the VANC of each field (for an interlaced signal) or frame (for a progressive signal) in the video. Note that this box should be cleared (unselected) unless you are certain that the receive computer requires it.
   - For an interlaced signal, the indicator is a '1' (ASCII code 0x31) to indicate field 1, and '2' (ASCII code 0x32) to indicate field 2.
   - For a progressive signal, each field indicator corresponds to the passing of one video frame, and the indicators still alternate between '1' and '2', even though a progressive signal consists of frames, rather than fields.

Assigning Data Ports

After you have defined one or more services, you need to assign data port(s) to them as described in the chapter "**Data Ports Configuration**" on page 6-1. The TES-8643 can simultaneously insert up to four data streams or extract up to four data streams. The eight streams may all be delivered via the network connection (**Ethernet** port) or one may be through the **Serial** port on the rear module. For each stream, you can specify the source port, and the insertion/extraction parameters.

Calculating the Data Throughput

This section briefly summarizes how to calculate the data throughput based on the data port type.

Serial Port

When encoding a transparent stream using data supplied through a serial port, the throughput depends on the Data Count and also on the serial port baud rate. The maximum throughput is the lesser of the baud rate and the data rate value resulting from the following equation:

`DR = FV x 10 x DC bits/second`

Where:

- `FV` is the field rate for interlaced formats, or the frame rate for progressive formats.
- `DC` is the Data Count set for the TES-8643.
- The factor 10 in the equation reflects the fact that each 8bit value is carried on the serial link with one start and one stop bit.

This is expressed in bits/second to allow comparison with the serial port baud rate.

For example, if FV = 59.94 and DC = 100, DR = 59,940 bits/second.

If the serial port speed is set to 57,600 bits/sec, the TES-8643 cannot fully use the capacity that has been reserved for this stream, and the throughput will be 57,600 bits/sec. If the port speed is 115,200 bits/sec, the TES-8643 will use flow control to maintain an average rate of 59,940 bits/sec However, if the transmit computer does not respect flow control, data will be lost.

This points out the importance of flow control. If you are not certain that the program you are using to send data to the TES-8643 responds properly to XON/XOFF flow control, it is advisable to select a Data Count value for the transparent stream which is large enough to ensure that flow control is never needed. For example, with FV= 59.94, a DC value of 193 or greater can transport a 115,200 bits/sec stream without flow control.

Similarly, when decoding a transparent stream, care must be taken to set the serial port baud rate high enough for the throughput of the stream. In the above example with DC=100, the serial port for the decode stream would need to be set to 115,200 bits/sec, since 57,600 bits/sec is insufficient to sustain the throughput of 59,940 bits/sec.

Ethernet Port

When encoding a transparent stream using data supplied through the TCP/LAN port, the throughput is completely defined by the Data Count specified for the stream, assuming that the transmit computer and LAN can supply data as needed. This is defined by the following equation:

`T = FV x DC bytes/second`

Where:

- `FV` is the field rate for interlaced formats, or the frame rate for progressive formats.
- `DC` is the Data Count set for the TES-8643.

Monitoring the Status via DashBoard

Use the Decode Status and Encode Status tabs to monitor the ANC services you have configured on the TES-8643. This list updates whenever you configure a new stream using one of the **ANC Encode** sub-tabs or the **ANC Decode** tab.

Monitoring the Encode and Decode Status

The **Encode** and **Decode Status** tabs provide read-only information on each stream currently configured on the TES-8643. You can also enable the alarm for each stream using the provided **Alarm Enable** check box. When the check box is selected for a stream, the corresponding **Status** field reports when error conditions are occurring for that stream. If the check box is cleared, the **Status** field will not report any error conditions even if they are occurring on the TES-8643.

Encoding Status

For each encode stream, the following read-only information is reported on the Encode Status tab:

- Encode Mode assigned to the stream or disabled. (e.g. `Encode Custom Packet` or `Encode Disabled`).
- Specified DID:SDID for the stream. (e.g. `DID:61 SDID:01`, `DID:10 SDID:01`)
- Indicator and current status. For example, a green indicator that displays `OK` in the **Status** field indicates the encoding stream is not experiencing errors. Most warning and error messages will be hidden if the **Alarm Enable** check box is not selected.
- Data rate reported in Bytes/second.

Decoding Status

For each decode stream, the following read-only information is reported on the **Decode Status** tab:

- Specified DID:SDID for the stream. (e.g. `DID:12 SDID:34`, `DID:10 SDID:06`)
- Indicator and current status. For example, a red indicator that displays `Decode stream not assigned to output port` in the **Status** field could indicate that the stream has not been assigned to a data port. Most warning and error messages will be hidden if the **Alarm Enable** check box is not selected.
- Data rate reported in Bytes/second.
- Line number(s), channel (`LUMA` or `CHROMA`), and/or field (`F1`, or `F2`).

Monitoring the Ethernet Data Ports

The **Ethernet** sub-tab in the **Ports** tab provides read-only information on each stream currently configured on the TES-8643 to be carried on an Ethernet port.

For More Information on...

- the status messages reported in the Ethernet sub-tab, refer to the section "**Ethernet Tab**" on page 8-11.

SCTE 104 Messages

In This Chapter

This chapter outlines how to configure the TES-8643 to manage SCTE 104 messages.

The following topics are discussed:

- Overview
- Selecting a Mode
- Encoding in a Transparent Stream
- Setting up GPI/Tally Communications
- Setting up Logging
- Data Port Based Encoding and Decoding

Note — *Before proceeding, ensure that you are running DashBoard software version 6.1.0 or higher. You can download the DashBoard Control System software and manual from the Ross Video website.*

Overview

For detailed information on using SCTE 104 splice insert (DPI) commands, refer to the ***SCTE 104 2011*** standard available from the Society of Cable Telecommunications Engineers.

GPI Based Encoding

When the SCTE 104 direction is set to encode, the eight GPIOs function as inputs. If a GPI message arrives at the same time as a data port message, it is inserted on the following field.

In the case where two or more GPIs are asserted simultaneously, all events are encoded into the same SCTE 104 multiple operation packet, in order of lowest GPI number through to the highest GPI number.

GPI Based Decoding

When the SCTE 104 direction is set to decoding, the eight GPIOs function as outputs, with each GPO assigned to a specified decoded SCTE 104 message. Each GPO is triggered by the arrival of a transport stream packet with the specified PID, and is then negated after a user-specified time-out. This lets you control the duration of the output pulse to meet your system requirements.

Encoding and Decoding via a Data Port

Since the packet format and DID/SDID values are fixed for SCTE 104 triggers, you only need to specify a serial port or network input, the direction (encode or decode), and the network port to be used for logging.

Event Logging

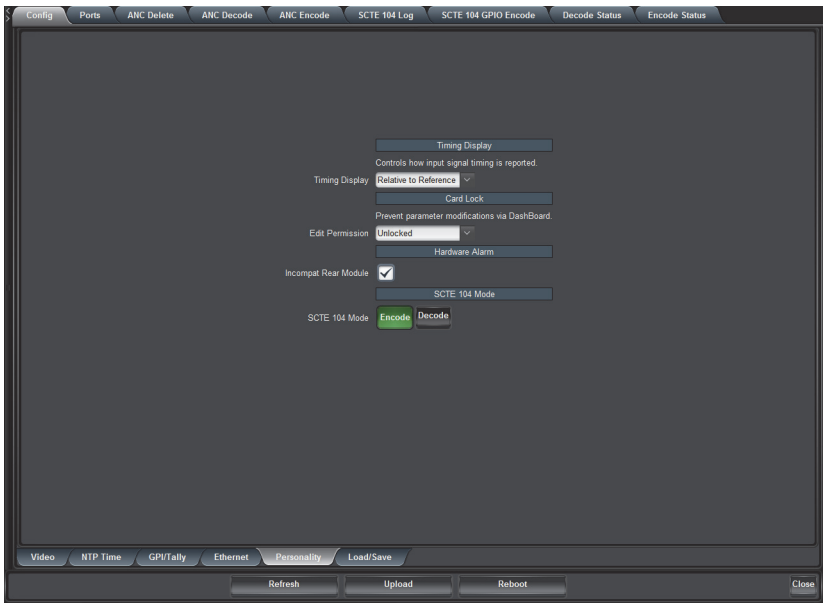
When installed in openGear frames with an MFC-8322-N, the TES-8643 uses NTP to properly timestamp messages and SCTE 104 event log entries. Note that this timestamp is expressed as UTC time only. Logging is limited to messages containing splice requests only. Refer to the section "**SCTE 104 Log Tab**" on page 8-19 for details on what read-only information is displayed in this tab.

Selecting a Mode

The TES-8643 can either encode or decode SCTE 104 triggers at any given time, and not a mix. You must select a mode from the **Personality** tab before configuring the TES-8643.

To select a mode

1. From the **Device View**, select the **Config** tab.
2. Select the **Personality** tab located at the bottom of the **Config** tab.



Config Tab — Personality Tab

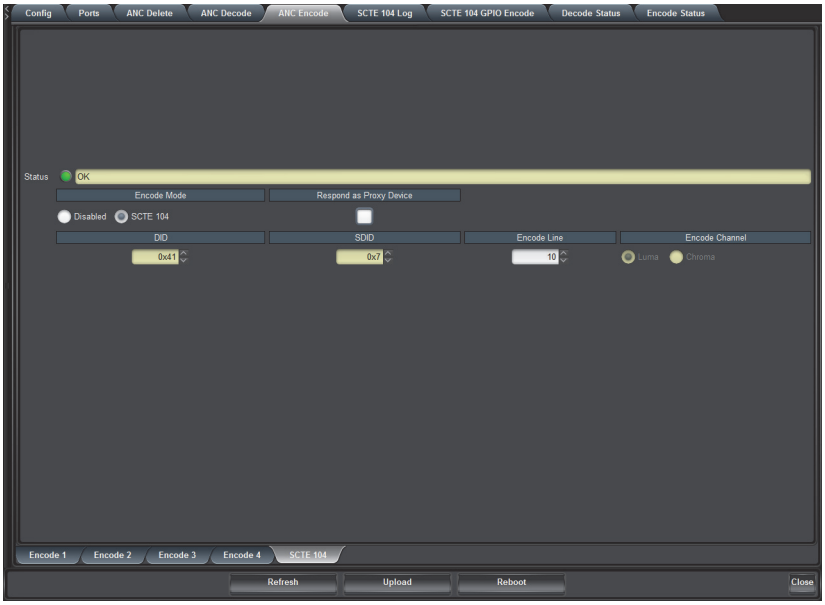
3. To enable the TES-8643 to encode SCTE 104 messages, click **Encode** in the **SCTE 104 Mode** area.
   - The **Encode** button is now lit green.
   - The **SCTE 104 GPIO Encode** tab is displayed in the **Device View** (as seen in the example above).
4. To enable the TES-8643 to decode SCTE 104 messages, click **Decode** in the **SCTE 104 Mode** area.
   - The **Decode** button is now lit green.
   - The **SCTE 104 GPIO Decode** tab is displayed in the **Device View**.

Encoding in a Transparent Stream

This section outlines how to enable the TES-8643 to identify the occurrence of an SCTE 104 trigger in a transparent stream by detecting the presence of that trigger on a specified line of the DID and SDID.

To specify a line for SCTE 104 messages

1. From the **Device View**, select the **ANC Encode** tab.
2. Select the **SCTE 104** tab located at the bottom of the **ANC Encode** tab.



ANC Encode Tab — SCTE 104 Tab

3. Select **SCTE 104** from the **Encode Mode**.
4. Specify a line in the **Encode Line** field. The PID and SDID are preset to values defined by ***SCTE 104 2011***.

Setting up GPI/Tally Communications

This section explains how to configure communications for GPIs on the card using the menus and options available in DashBoard. Each of the GPI/O ports can be configured for SCTE 104 messages.

GPI Overview

When configured as a GPI for SCTE 104 messages, a port behaves as an input, and can be used to transmit SCTE 104 messages. A push-button switch, or an ON-OFF switch, may be directly connected between the port and the adjacent ground pin. Alternatively, an external device may drive a low level. Minimum pulse duration is 1ms, anything shorter will be filtered out.

Typically, you will configure the GPI for Edge trigger. This means that the action is carried out either on the falling edge (button is pushed), or rising edge (button is released), depending on which Polarity is selected. Alternatively, users may configure the GPI for Level trigger. In this mode, the action is carried out on both the rising and falling edges, so there are effectively two states. The Polarity control can be used to invert the behavior. Regardless of the trigger type, GPI commands may be overridden by other command inputs such as serial protocols.

Edge

This option enables the GPI to act as a latching trigger. Edge triggers are used when you want to toggle between settings. This option enables the GPI to execute a specific function.

- If configured for Falling Edge, the selected function is executed when the GPI input signal transitions from High to Low.
- If configured for Rising Edge, the selected function is executed when the GPI input signal transitions from Low to High.
- Edge triggered GPI signals are sampled once a frame and the associated function is executed only once per frame. The minimum pulse width is 1 millisecond.
- Typically, the edge triggered GPI is driven by external equipment that generates one pulse per event.

Level

Level triggers are used when you want to assert a particular state for a setting. You define the on-air state of the function as being either Level High or Level Low.

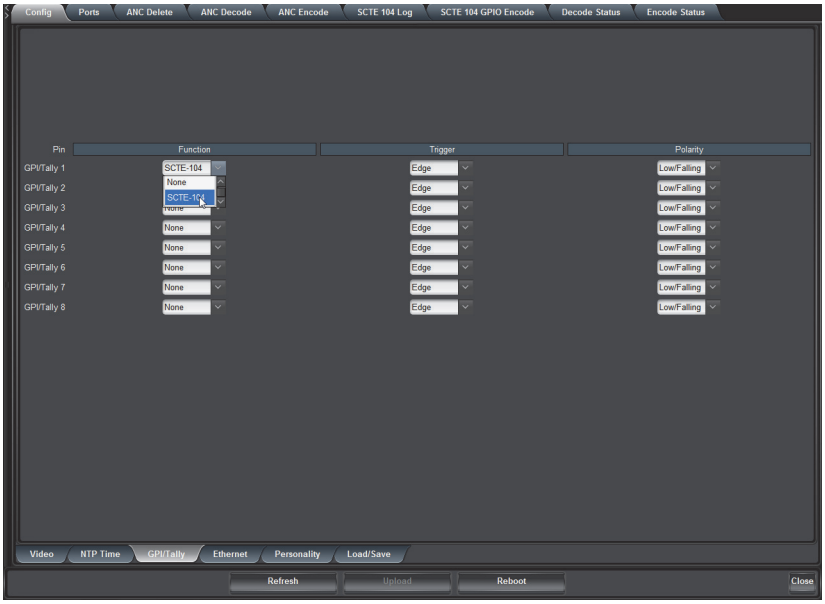
- If configured for Active Low, the selected function is executed when the GPI input signal is driven Low.
- If configured for Active High, the selected function is executed when the GPI input signal is driven High.

GPIO Configuration

The TES-8643 allows you to set a different data matching string for each of its eight GPIO ports. But first you must configure each port you wish to use.

To set up basic GPIO communications

1. From the **Device View** in DashBoard, select the **Config** tab.
2. Select the **GPI/Tally** tab located at the bottom of the **Config** tab.



Config Tab — GPI/Tally

3. To configure a port for SCTE 104 messages:
   - Enable the port by selecting **SCTE-104** from the **Function** field next to the GPI in the **GPI/Tally** area.
   - Select a trigger for the GPIO from the **Trigger** column.
   - Select a polarity for the GPIO from the **Polarity** column.

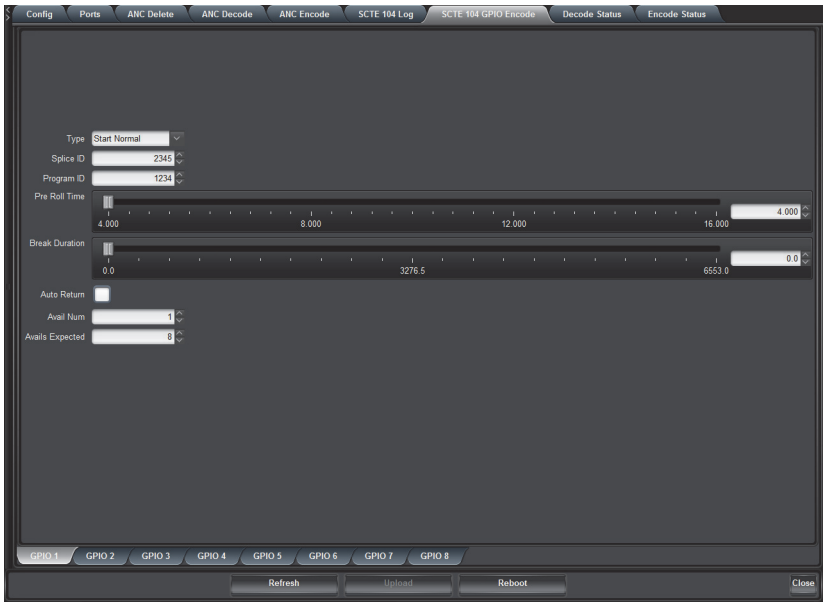
Configuring the TES-8643 to Encode

Configure the TES-8643 to encode via GPIs when you want to use contact closures to cause insertion of one of a group of predefined SCTE 104 messages. You can use the options in DashBoard to define the set of messages and this information is stored in the non-volatile memory in the VANC Processor. In this case, the TES-8643 becomes a GPI-driven SCTE 104 *inserter*.

To configure the TES-8643 to encode

1. From the **Tree View**, select the node for the TES-8643 you want to access.
2. Select the **SCTE 104 GPIO Encode** tab. Each Decode service (GPIO 1-8) is allocated a sub-tab, enabling you to configure each service separately.

Operating Tip — *If the **SCTE 104 GPIO Encode** tab is not displayed, ensure the SCTE 104 Mode **Encode** button is selected (lit green) in the **Personality** tab.*



SCTE 104 GPIO Encode Tab — GPIO 1

3. Select the sub-tab for the **GPIO** you wish to configure.
4. Use the **Type** menu to specify the class of splice insertion. Refer to **Table 8.21** on page 8-20 for a list of options.
5. Use the **Program ID Value** field to specify that any packet bearing the specified PID is treated as a trigger; the GPIO output is asserted for the duration specified by the message. The TES-8643 activates the GPIO when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.
6. Use the **Splice ID Value** field to specify the splice insert command that the TES-8643 searches for in the trigger. The TES-8643 activates the GPIO when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.
7. Use the **Pre Roll Time** slider to set the number of seconds to wait before initiating the trigger. Ensure that **Type** is not set to **Start Immediate** or **End Immediate**.
8. Use the **Break Duration** slider to specify the number of seconds for the insertion length. Ensure that **Type** is not set to **End Normal** or **End Immediate**.
9. Select the **Auto Return** box to enable the TES-8643 to automatically return an acknowledgement to the device connected to the specified GPIO. Ensure that **Type** is not set to **End Normal** or **End Immediate**.
10. Use the **Avail Num** field to specify the amount of Avails within the associated PID.
11. Use the **Avails Expected** field to specify the total number of the expected Avails during the trigger. When set to 0, this field is ignored.

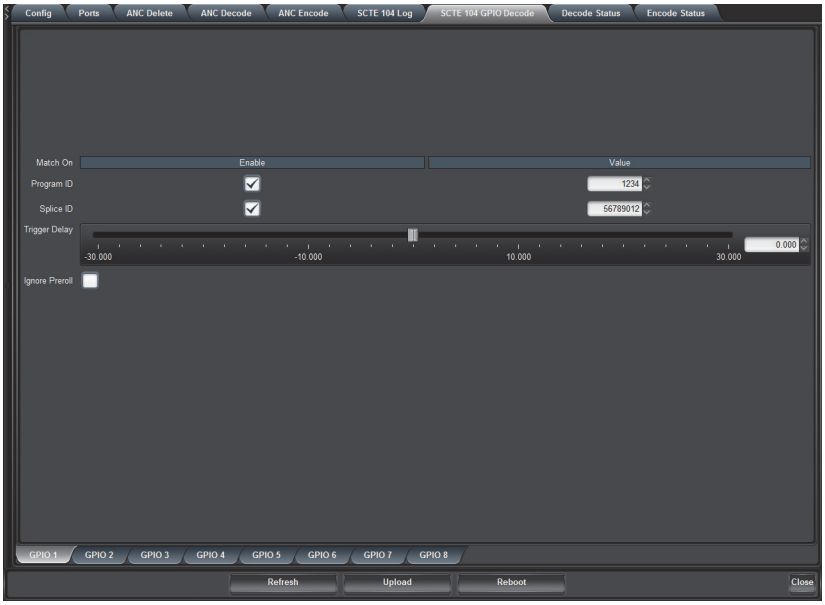
Configuring the TES-8643 to Decode

Configure the TES-8643 for GPI-based decoding if you want to create contact closure outputs in response to predefined SCTE 104 messages. You can use the options in DashBoard to define the set of messages and this information is stored in non-volatile memory in the VANC Processor. In this case, the TES-8643 becomes a SCTE 104 *receiver* with contact closure outputs.

To configure the TES-8643 to decode

1. From the **Tree View**, select the node for the TES-8643 you want to access.
2. Select the **SCTE 104 GPIO Decode** tab.

Operating Tip — *If the **SCTE 104 GPIO Decode** tab is not displayed, ensure the SCTE 104 Mode **Decode** button is selected (lit green) in the **Personality** tab.*

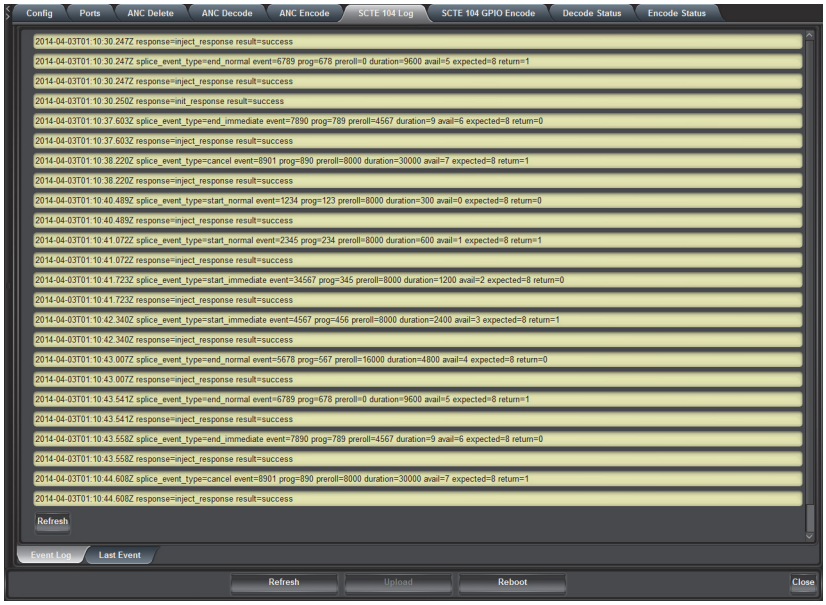


SCTE 104 GPIO Decode Tab — GPIO 1

3. Select the sub-tab for the **GPIO** you wish to configure.
4. To match the Program ID to the trigger:
   - Select the **Program ID** box in the **Enable** column.
   - Use the **Program ID Value** field to specify the Program ID value that the TES-8643 searches for in the trigger. The TES-8643 activates the GPO when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.
5. To match the Splice ID in the trigger:
   - Select the **Splice ID** box in the **Enable** column.
   - Use the **Splice ID Value** field to specify the Splice ID value that the TES-8643 searches for in the trigger. The TES-8643 activates the GPO when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.
6. Use the **Trigger Delay** slider to augment when the pre-roll begins (in milliseconds). This field allows the GPIO pulse signal to be delayed if required for compatibility with connected equipment. This should normally be set to 0 unless you know that a delay is needed.
7. Select the **Ignore Pre-roll** box to enable the TES-8643 to ignore any pre-roll values and initiate the trigger immediately.

Setting up Logging

The TES-8643 maintains a list of trigger events and presents them in reverse chronological order in the **Event Log** sub-tab of the **SCTE 104 Log** tab. An example is shown in the following screen capture.


Config
Ports
ANC Delete
ANC Decode
ANC Encode
SCTE 104 Log
SCTE 104 GPIO Encode
Decode Status
Encode Status
2014-04-03T01:10:30.247Z response=inject_response result=success
2014-04-03T01:10:30.247Z splice_event_type=end_normal event=6789 prog=678 preroll=0 duration=9600 avail=5 expected=8 return=1
2014-04-03T01:10:30.247Z response=inject_response result=success
2014-04-03T01:10:30.250Z response=init_response result=success
2014-04-03T01:10:37.603Z splice_event_type=end_immediate event=7890 prog=789 preroll=4567 duration=9 avail=6 expected=8 return=0
2014-04-03T01:10:37.603Z response=inject_response result=success
2014-04-03T01:10:38.220Z splice_event_type=cancel event=8901 prog=890 preroll=8000 duration=30000 avail=7 expected=8 return=1
2014-04-03T01:10:38.220Z response=inject_response result=success
2014-04-03T01:10:40.489Z splice_event_type=start_normal event=1234 prog=123 preroll=8000 duration=300 avail=0 expected=8 return=0
2014-04-03T01:10:40.489Z response=inject_response result=success
2014-04-03T01:10:41.072Z splice_event_type=start_normal event=2345 prog=234 preroll=8000 duration=600 avail=1 expected=8 return=1
2014-04-03T01:10:41.072Z response=inject_response result=success
2014-04-03T01:10:41.723Z splice_event_type=start_immediate event=34567 prog=345 preroll=8000 duration=1200 avail=2 expected=8 return=0
2014-04-03T01:10:41.723Z response=inject_response result=success
2014-04-03T01:10:42.340Z splice_event_type=start_immediate event=4567 prog=456 preroll=8000 duration=2400 avail=3 expected=8 return=1
2014-04-03T01:10:42.340Z response=inject_response result=success
2014-04-03T01:10:43.007Z splice_event_type=end_normal event=5678 prog=567 preroll=16000 duration=4800 avail=4 expected=8 return=0
2014-04-03T01:10:43.007Z response=inject_response result=success
2014-04-03T01:10:43.541Z splice_event_type=end_normal event=6789 prog=678 preroll=0 duration=9600 avail=5 expected=8 return=1
2014-04-03T01:10:43.541Z response=inject_response result=success
2014-04-03T01:10:43.558Z splice_event_type=end_immediate event=7890 prog=789 preroll=4567 duration=9 avail=6 expected=8 return=0
2014-04-03T01:10:43.558Z response=inject_response result=success
2014-04-03T01:10:44.608Z splice_event_type=cancel event=8901 prog=890 preroll=8000 duration=30000 avail=7 expected=8 return=1
2014-04-03T01:10:44.608Z response=inject_response result=success
Refresh
Event Log
Last Event
Refresh
Upload
Reboot
Close

SCTE 104 Log Tab — Event Log Sub-tab

Each entry includes the GPIO number, date and time, Splice Event ID, and type of event.

The tab displays the last 24 of a possible 4000 log entries. At a typical rate of 2 trigger events per hour, it will hold over 20 days of triggers for one GPIO or 2.6 days for eight GPIOs. When it fills, the oldest entries are removed to make room for new ones.

Alternately, the **Last Event** sub-tab of the **SCTE 104 Log** tab displays the last log entry for each GPIO and the data port configured for SCTE 104 triggers. Refer to **Table 8.20** on page 8-19 for details on the information displayed in this tab.

Logging via the Ethernet Port

You can configure the **Ethernet** port on the TES-8643 rear module to output the log entries. Note that the TES-8643 discards all existing log entries on initial connection, then continues reporting events as they occur.

For More Information on...

- configuring this port, refer to the section "**Configuring the Ethernet Data Ports**" on page 6-3 for details.

Data Port Based Encoding and Decoding

The TES-8643 can operate as an SCTE 104 proxy device when you have an automation systems (AS) that sends SCTE 104 messages over a network or serial connection. The TES-8643 recognizes and accepts messages addressed to an “Injector”, rejects others, responds appropriately to the AS, divides the message into VANC packets if needed, appends the Payload Descriptor byte to each VANC packet per SMPTE 2010, inserts the packets into VANC, and maintains a log of transmissions.

If you require the TES-8643 for an AS application, you can assign a data port (serial or Ethernet) as described in the chapter “**Data Ports Configuration**” on page 6-1.

Data Ports Configuration

In This Chapter

This chapter outlines how to configure the **Serial** and **Ethernet** ports on the rear module. Before proceeding, ensure that you have configured the ANC encode and/or decode services, and the Ethernet communication settings, for your TES-8643 as outlined in the previous chapters.

For details on using a Comtrol® DeviceMaster® with the TES-8643, refer to the chapter "**Appendix A. Using a Port Expander**" on page 7-1.

The following topics are discussed:

- Configuring the Serial Data Port
- Configuring the Ethernet Data Ports

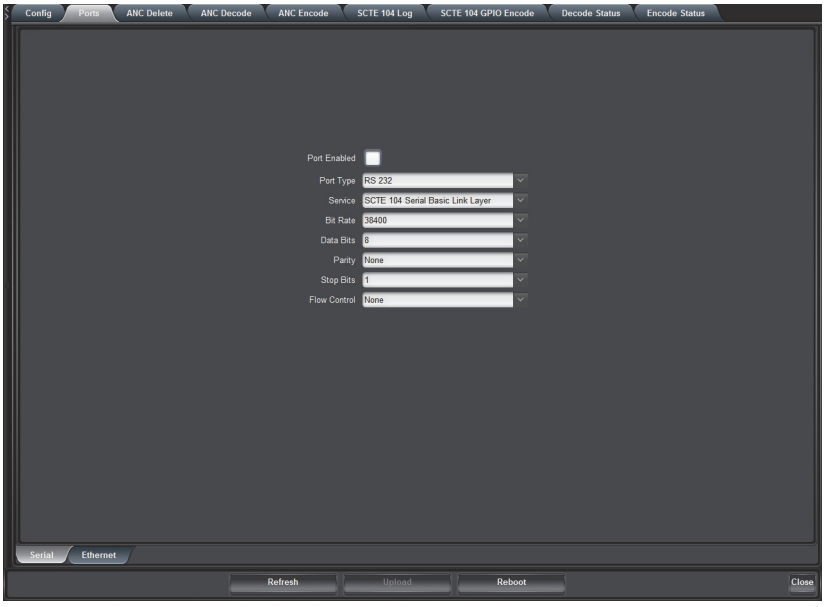
Configuring the Serial Data Port

This section outlines how to configure the TES-8643 to communicate over the **Serial** port on the rear module.

Note — *When the Serial port is disabled, any incoming data on the port is discarded by the TES-8643. The Bit Rate, Data Bits, Parity and Stop Bits fields are ignored.*

To configure serial communications

1. From the **Tree View**, select the node for the TES-8643 you want to access.
2. Select the **Ports** tab.
3. Select the **Serial** tab located at the bottom of the **Ports** tab.



Ports — Serial Tab

4. Use the **Port Type** menu to specify the transmission standard used by the external device connected to the **Serial** port.
5. Use the **Service** menu to specify the information to be transmitted on the **Serial** port. Refer to the **Table 8.11** on page 8-9 for a list of options.

Note — *The SCTE 104 Serial Basic Link Layer protocol can only be active on the serial port, or on the Ethernet port, but not both. Should you attempt to enable the same protocol on both ports, the TES-8643 automatically disables the first port (the **Enabled** box is cleared).*

6. Use the **Bit Rate**, **Data Bits**, **Parity**, and **Stop Bits** menus to configure the communication standards for the **Serial** port.
7. Use the **Flow Control** menu to regulate the data transmission on the serial communication link using specific ASCII characters to start or stop the flow of data.
8. Select the **Port Enabled** box to apply your changes and enable communication on the **Serial** port.

Configuring the Ethernet Data Ports

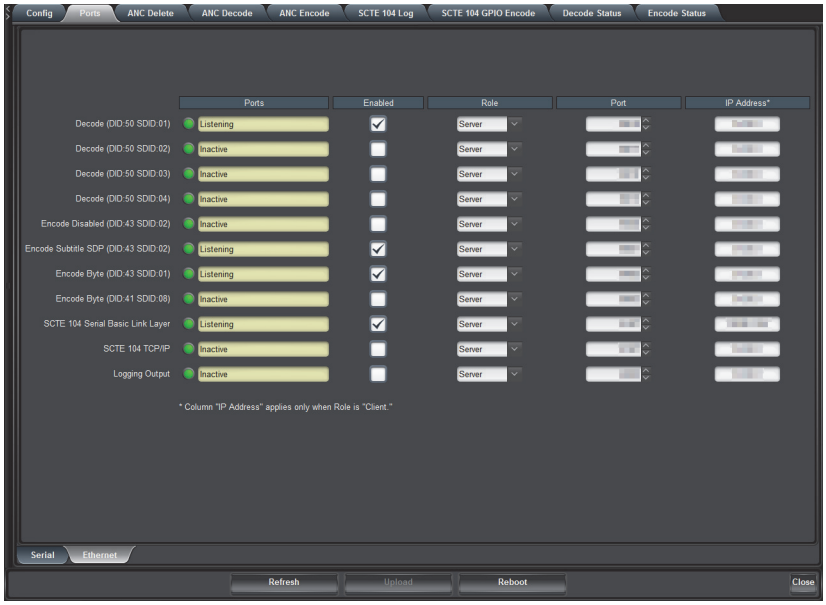
This section outlines how to configure the **Ethernet** port on the rear module to communicate with equipment via your facility network.

For More Information on...

- the settings available in the **Ports** tabs, refer to the section "**Ports Menus**" on page 8-9.
- configuring the Ethernet port as a logging output for SCTE-104 messages, refer to the section "**Setting up Logging**" on page 5-9.

To configure an ethernet data port

1. From the **Tree View**, select the node for the TES-8643 you want to access.
2. Select the **Ports** tab.
3. Select the **Ethernet** tab located at the bottom of the **Ports** tab.



Ports — Ethernet Tab

4. Locate the service you want to transmit via the network connection. Note that the list of ANC services depends on the settings of the **ANC Encode** and **ANC Decode** tabs.

Note — *The SCTE 104 Serial Basic Link Layer protocol can only be active on the serial port, or on the Ethernet port, but not both. Should you attempt to enable the same protocol on both ports, the TES-8643 automatically disables the first port (the **Enabled** box is cleared).*

5. From the **Role** menu, configure how the TES-8643 functions on the network. Choose from the following:
   - **Server** — TES-8643 functions as a host, or socket listener.
   - **Client** — TES-8643 functions as a service requester that initiates communications with a server.
6. From the **Port** menu, specify the port number to be used for this VANC decode or encode service. This port number applies to the server, which can be either the TES-8643 or the remote device, depending on the **Role** setting.

7. From the **IP Address** menu, specify the IP address of the external device if you selected **Client** in step 5.
8. Select the **Enabled** box for the required service.

Appendix A. Using a Port Expander

In This Appendix

This appendix describes how to set up the TES-8643 and the Comtrol® DeviceMaster® to work together.

- Before You Begin
- DeviceMaster Setup
- TES-8643 Setup

Before You Begin

The Comtrol® DeviceMaster® connects to the TES-8643 over Ethernet and provides a number of RS-232/422/485 serial ports.

Requirements

Before you begin, ensure that you have the following items:

- Comtrol® DeviceMaster® Port Expander
- Ethernet interface cables

Comtrol® DeviceMaster® Pinouts

Table 7.1 Serial Pinouts

Pin	RS-232	RS-422
1	CD	n/c
2	Rx	RxA (Rx-)
3	Tx	TxA (Tx-)
4	DTR	n/c
5	Ground	n/c
6	DSR	n/c
7	RTS	TxB (Tx+)
8	CTS	RxB (Rx+)
9	RI	n/c

Compatibility

Table 7.2 Compatibility

	Version
Comtrol DeviceMaster Socket Server	7.31
Comtrol PortVision Plus	4.08
TES-8643	1.0

DeviceMaster Setup

This procedure assumes that a DeviceMaster is already installed in your facility. If not, or if you are encountering difficulties configuring your DeviceMaster via a web browser, it is recommended to use the Comtrol® PortVision® software to set up your DeviceMaster. Refer to your DeviceMaster documentation for details on using this software or for troubleshooting your installation.

To set up a DeviceMaster

1. On your computer, open your web browser and, in the address bar, enter the IP address of your DeviceMaster and press **Enter**. The default address is **192.168.250.250**.
2. Click **Configure Network**.
3. Click **Use static configuration below:** and enter the IP Address, Netmask, and Gateway you want to use. A static IP Address is recommended for the DeviceMaster to communicate with the TES-8643.
4. Click **Save**. Changes do not take effect until the DeviceMaster is rebooted.
5. Click **Port x**, where **x** is the port on the DeviceMaster you are connecting a device to.
6. Enter the Serial Configuration information for your device.
   - Enter the TCP Connection Configuration information for your device:
   - **Enable** — selected
   - **Listen** — selected
   - **Port** — Ross Video suggests that you start numbering the ports at **8701**.
   - Leave all other settings at their default values.
7. Click **Save**. Changes do not take effect until the DeviceMaster is rebooted.
8. Reboot the DeviceMaster.

TES-8643 Setup

This section outlines how to configure the TES-8643 to communicate with the Comtrol® DeviceMaster® via an ethernet protocol.

To set up communications

1. From the **Tree View** in DashBoard, expand the node for the TES-8643 you want to access.
2. Select the **Ports** tab.
3. Select the **Ethernet** tab located at the bottom of the **Ports** tab.
4. Locate the Encode and/or Decode stream in the provided list that you want to access via the Comtrol® DeviceMaster® port.
5. From the **Role** menu, select **Client**.
6. From the **Port** menu, specify the port number for the DeviceMaster.
7. From the **IP Address** menu, specify the IP Address of the DeviceMaster.
8. Select the **Enabled** box for the Encode and/or Decode stream.
9. Repeat step 4. to step 8. for each stream as required.

Appendix B. DashBoard Menus

In This Appendix

This appendix provides a brief summary of the menus available for the TES-8643. Default values are indicated with an asterisk (*).

The following topics are discussed:

- Status Tabs
- Configuration Menus
- Ports Menus
- ANC Delete Menus
- ANC Decode Menus
- ANC Encode Menus
- SCTE 104 Log Tab
- SCTE 104 GPIO Encode Menus
- SCTE 104 GPIO Decode Menus
- Decode Status Menus
- Encode Status Menus

Note — *Before proceeding, ensure that you are running DashBoard Control System software version 6.1.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.*

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs. The fields in the **Status** tabs vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Signal Tab

Table 8.1 summarizes the read-only information displayed in the **Signal** tab.

Table 8.1 Signal Tab Items

Menu Title	Item	Parameters	Description
Signal	Reference Status	No Reference	No signal detected on the selected reference input
		Incompatible: ###	A reference signal is detected but the format is incompatible with the current output mode
		Unlocked: ###	A reference signal is detected but the card is not locked to it
		###	Indicates the reference format detected
	Input 1 Status	Format # (Green)	Indicates the detected input format
		Format # - No Signal (Red)	The input signal is not detected and the Input 1 Loss alarm is enabled
		Error - Unsupported (Red)	The input format is incompatible with the output format
		Error - Incompatible (Yellow)	The input format is incompatible with its selected function such as the input format does not match output format. If an input is not selected for one of these functions, no error is indicated.
	Timing Display[a]	Relative to Reference	The **Input Timing** fields display the input signal timing values relative to the selected reference
		Input to Output	The **Input Timing** fields display the input signal timing values relative to the SDI output of the card
	Input 1 Timing	## Clocks ## lines	Indicates the timing of the specified SDI input to what is selected in the **Personality** tab. The display is in output format clocks and lines.
	Output Timing	## Clocks ## lines	Indicates the relative timing of the output to the selected reference signal

a. This can be changed via the Timing Display menu located on the Personality tab.

Hardware Tab

Table 8.2 summarizes the read-only information displayed in the **Hardware** tab.

Table 8.2 Hardware Tab Items

Menu Title	Item	Parameters	Description
Hardware	HW Status	OK (Green)	Normal operation; no hardware errors and the correct rear module is installed
		Incomp I/O module (Red)	Card is connected to the wrong rear module
		Alarm suppressed (Green)	Rear module is incompatible and the **Incompat Rear Module** alarm is disabled
	Voltage (V)	#	Measured input voltage
	Current (mA)	#	Current consumption in milliAmperes
	Power (W)	#	Calculated power of the card
	FPGA Temp	##C / ##F	FPGA Core temperature. A warning is displayed when the card FPGA Core Temperature reaches 85°C. If the temperature reaches 100°C, the card automatically shuts down to avoid permanent damage and will have to be re-booted, or power cycled, to resume normal operation.
	CPU Usage	x.xx / y.yy / z.zz	Displays the CPU Load average where: • **x.xx** represents in the last minute • **y.yy** represents the last five minutes • **z.zz** represents the last fifteen minutes
	RAM Available	# / ##	CPU Memory Used / Total CPU Memory
	CF Card Status[a]	Not used	CompactFlash™ card is not implemented
		#.## of # GB used	Displays the amount of space used on the CompactFlash card
		Missing	CompactFlash card is not present
		Unreadable	An error occurred such as incompatible CompactFlash card, or the card cannot be read

a. The CompactFlash™ card is not currently used by the TES-8643.

Product Tab

Table 8.3 summarizes the read-only information displayed in the **Product** tab.

Table 8.3 Product Tab Items

Menu Title	Item	Parameters	Description
Product	Product	TES-8643	Indicates the product name
	Supplier	Ross Video Ltd.	Indicates the manufacturer of your card
	Board Rev	##	Indicates the board version of your card
	Serial Number	######	Indicates the serial number of your card
	Rear Module	#	Indicates the type of rear module in the slot
	Software Rev	##.##	Indicates the software and build versions
	Firmware Rev	#.###	Indicates the FPGA version number

Network Status Tab

Table 8.4 summarizes the read-only information displayed in the **Network Status** tab.

Table 8.4 Network Status Tab Items

Tab Title	Item	Parameters	Description
	IP Address	##.#.###.###	IP Address of the card
	Subnet Mask	###.###.#.#	Subnet Mask for the card
	Default Gateway	##.#.#.#	Card gateway
	Ethernet Status	OK	Ethernet communications for the TES-8643 are valid
		Link Down	Ethernet communications for the TES-8643 are invalid. The ethernet cable may be disconnected on the rear module or the ethernet network may be down or experiencing problems.
		No IP Address	The following conditions are occurring: • The **Method** is set to **DHCP**. • The ethernet cable connection to the TES-8643 rear module is correct. • A valid IP Address could not be obtained. The DHCP server may be down or is still powering up after a power outage.
	##:##:##:##:##:##		Indicates the MAC Address for the TES-8643

Configuration Menus

This section briefly summarizes the sub-tabs available in the **Config** tab.

Video Tab

Table 8.5 summarizes the **Video** set up options available in DashBoard.

Table 8.5 Video Menu Items

Menu Title	Item	Parameters	Description
Video State	Video State[a]	Active (Green)	IN 1 is available for processing, and OUT 1 is driven by the TES-8643
		Relay in Bypass (Red)	IN 1 bypasses the TES-8643 and is looped passively on OUT 1 through the relay. Note IN 1 cannot be detected by the TES-8643 in this state.
Reference Setup	Reference Input	Frame 1*	TES-8643 uses the reference source connected to the **REF 1** port on the frame
		Frame 2	TES-8643 uses the reference source connected to the **REF 2** port on the frame
		Local	TES-8643 uses the external reference source connected to the **ANLG REF IN** BNC on the rear module. You must also configure **JP7** on the card to enable or disable a 75ohm terminator on the external reference input.
		Input #	TES-8643 locks to the specified SDI input on the rear module
Output Setup	Video Format	480i 59.94	Selects the video format for the output signal. Note that a change in video format will not take effect until the reference is compatible.
		720p 59.94	
		1080i 59.94*	
		1080p 59.94 LEVEL A	
		576i 50	
		720p 50	
		1080i 50	
		1080p 50 LEVEL A	

a. This option is not available when using an incompatible rear module.

NTP Time

Table 8.8 summarizes the read-only information displayed in the **NTP Time** tab.

Table 8.6 NTP Time Menu Items

Menu Title	Item	Parameter	Description
	NTP Status	Present (Green)	Indicates a valid time source is reporting to the TES-8643
		Time Source missing (Red)	Indicates that the time source reporting to the TES-8643 is invalid or absent
	NTP Time	yyyy-Mm-Dd hh:mm:ss UTC	Indicates the current date based on NTP, where: • **yyyy** represents the year • **Mm** represents the month • **Dd** represents the day • **hh**:**mm**:**ss** represents the current local time (hours:minutes:seconds)

GPI Configuration

The menu items available in the **GPI/Tally** tab enable you to configure each GPI.

Table 8.7 GPI Configuration Menu Items

Option Title	Item	Parameter	Description
GPI/Tally #	Function	None*	The GPI/O port is not configured and the GPI has no effect
		SCTE-104	Specifies that the port will be used for SCTE 104 trigger encoding/decoding[a]
	Trigger	Edge*	Performs the function when a transition edge is detected on the GPI input. The Low-to-High or High-to-Low active edge is set by the Polarity control.
		Level	Performs the function when a voltage level is driven on the GPI input. The voltage level High or Low is set by the Polarity control.
	Polarity	High/Rising	Sets the polarity of the edge or level trigger. In the case of edge trigger, a Low-to-High transition starts the function. In the case of level trigger, a high level starts the function.
		Low/Falling*	Sets the polarity of the edge or level trigger. In the case of the edge trigger, a High-to-Low transition starts the function. In the case of level trigger, a low level starts the function.

a. The SCTE 104 Trigger Mode option in the Personality tab determines whether the port will be used for encoding or decoding. Refer to **Table 8.9** on page 8-8 for more information.

Ethernet Tab

Table 8.8 summarizes the **Ethernet** options available in DashBoard.

Table 8.8 Ethernet Menu Items

Menu Title	Item	Parameter	Description
Ethernet	Method	Static	User manually supplies the network settings
		DHCP*	Automates the assignment of the network settings
	IP Address	##.#.#.###	The IP Address for the card
	Subnet Mask	###.#.#.#	The subnet mask for the card
	Default Gateway	##.#.#.#	The gateway for communication outside of the local area network (LAN)
	Apply Changes		Applies and saves any changes made to the **Ethernet Settings**
	Cancel		Cancels any setting changes and resets the **Ethernet Settings** to the previous values
	Ethernet Status	OK	Ethernet communications for the card are valid
		Link Down	Ethernet communications for the card are invalid. The ethernet cable may be disconnected on the rear module or the Ethernet network may be down.
		No IP Address	The following conditions may be occurring: • The **Method** is set to **DHCP** and the DHCP server is not available • The ethernet cable is disconnected from the card rear module • A valid IP Address is no longer available. The DHCP server may be down or is still powering up after a loss of power.
	##:##:##:##:##:## (read-only)		The MAC Address for the card

Personality Tab

Table 8.9 summarizes the options available in the **Personality** tab.

Table 8.9 Personality Menu Items

Option Title	Item	Parameters	Description
Timing Display	Timing Display	Relative to Reference*	The **Input Timing** fields in the **Signal** tab display the timing values relative to the reference
		Input to Output	The **Input Timing** fields in the **Signal** tab display the timing values relative to the output
Card Lock	Edit Permission	Unlocked*	Menu options are unlocked and editable from DashBoard
		Locked	All menu items, except this one, are locked and read-only
Hardware Alarm	Incompat Rear Module	Selected*	**Rear Module** field in the Product tab reports when a rear module is not compatible with the TES-8643
		Cleared	Disables the alarm
SCTE 104 Mode	Encode	Selected (Green)	Configures the TES-8643 as an encoder of SCTE 104 triggers. All GPIO ports are automatically configured as inputs.
		Not selected (Grey)	TES-8643 does not encode SCTE 104 triggers
	Decode	Selected (Green)	Configures the TES-8643 as a decoder of SCTE 104 triggers. All GPIO ports are automatically configured as outputs.
		Not selected (Grey)	TES-8643 does not decode SCTE 104 triggers

Load/Save Tab

Table 8.10 summarizes the options in the **Load/Save** tab.

Table 8.10 Load/Save Menu Items

Menu Title	Item	Parameter	Description
Global Settings	Load Factory Defaults		Resets all DashBoard parameters and values (excluding ethernet, reference, and output format settings) to the factory default values

Ports Menus

This section summarizes the options in the **Ports** tab. The Serial and Ethernet ports have separate tabs so that different settings can be maintained.

Serial Tab

Table 8.11 summarizes the options in the **Serial** sub-tab.

Table 8.11 Serial Menu Items

Menu Title	Item	Parameters	Description
Serial	Port Enabled	Selected	Enables the serial port on the Rear Module to communicate with a serial device
		Cleared*	Disables the serial port on the Rear Module
	Port Type	None*	No transmission standard is specified.
		RS 232	Select this option if the card is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard.
		RS 422	Select this option if the card is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the Rx receive end is terminated with a 120ohm resistor on the card.
		RS 422 unterm	Select this option if the card is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated.
		RS 422 NULL	Select this option if the card is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the Rx receive end is terminated with a 120ohm resistor on the card.
		RS 422 NULL unterm	Select this option if the card is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated.

Table 8.11 Serial Menu Items

Menu Title	Item	Parameters	Description
	Service	Decode (DID: # SDID: #)	Specifies which VANC service is assigned to the **Serial** port. Note that this list corresponds to the labels on the Ethernet sub-tab.
		Encode x[a] (DID: # SDID: #)	
		SCTE 104 Serial Basic Link Layer[b]	
		Logging Output	
	Bit Rate	9600	Selects the bit rate for the external device connected to the Serial port
		19200	
		38400	
		57600	
		115200	
	Data Bits	7	Sets the number of data bits transmission (character length)
		8	
	Parity	None	Sets the Parity type
		Even	
		Odd	
	Stop Bits	1	Sets the number of stop bits transmission
		2	
	Flow Control	None*	Disables this feature
		SW	Flow control is used to maintain the byte count data rate. If the port provides more data than can be inserted, then the data will be buffered until the port is flow controlled. Since the maximum baud rate is 115200, the TES-8643 transmits up to 192bytes per field @ 60Hz.

a. Where x represents the Encode Mode assigned to the service.
b. This option is mutually exclusive with the SCTE104 Serial Basic Link Layer option on the Ethernet tab.

Ethernet Tab

Table 8.12 summarizes the options in the **Ethernet** sub-tab.

Table 8.12 Ethernet Menu Items

Menu Title	Item	Parameters	Description
x[a] (DID:# SDID:#) or SCTE 104 Serial Basic Link Layer[b] or SCTE 104 TCP/IP or Logging Output	Ports (read-only)	Inactive (Green)	**Enabled** box is not selected for this protocol
		Connected (Green)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • Specified IP address and Port number are valid • TES-8643 has successfully established connection to the given IP address and port
		Listening (Green)	• **Enabled** box is selected for this protocol • **Role** is set to **Server** • Specified Port number is valid • TES-8643 is ready to accept connections on the specified port
		Reconnecting (Yellow)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • TES-8643 attempts to connect periodically to the specified IP address and Port number. The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.
		Connecting (Yellow)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • TES-8643 is attempting to connect to the specified IP address and Port Number
		Port in use (Red)	• **Enabled** box is selected for this protocol • **Role** is set to **Server** • Port Number specified in the Port field is invalid or in use by another service
		Cannot connect (Red)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • Specified IP address and Port Number are invalid or in use by another device
	Enabled	Selected	Enables the specified communication protocol on the ethernet port
		Cleared*	Disables the specified communication protocol on the ethernet port. When the check box is cleared, any incoming data from the service is ignored.

Table 8.12 Ethernet Menu Items

Menu Title	Item	Parameters	Description
Ethernet	Role	Server*	TES-8643 function as a host, or socket listener, on the network
		Client	TES-8643 functions as a service requester that initiates communications with a server
	Port	#	When **Role** is set to **Server**: • specifies the TCP port number where the TES-8643 will listen. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for ethernet communications When **Role** is set to **Client**: • specifies the remote port number to which the TES-8643 will try to connect
		#	When **Role** is set to **Client**, specifies the port number of the external device
	IP Address	#.#.#.#	• Only applicable when **Role** is set to **Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the external device

a. Where x represents the service.
b. This option is mutually exclusive with the SCTE104 Serial Basic Link Layer option on the Serial tab.

ANC Delete Menus

Table 8.13 summarizes the settings in the **ANC Delete** tab.

Table 8.13 ANC Delete Menu Items

Menu Title	Item	Parameters	Description
	Line (read-only)	#	Specifies the line where the TES-8643 will delete the VANC data
	Luma	Selected	Deletes all VANC data in the luma channel for the specified line
		Cleared*	VANC data remains in the luma channel
	Chroma	Selected	Deletes all VANC data in the chroma channel for the specified line
		Cleared*	VANC data remains in the chroma channel
	Clear All	Luma	Clears all the check boxes for all luma channels
		Chroma	Clears all the check boxes for all chroma channels
	Set All	Luma	Selects all check boxes for all luma channels
		Chroma	Selects all check boxes for all chroma channels

ANC Decode Menus

Table 8.14 summarizes the settings in the **ANC Decode** tab.

Table 8.14 ANC Decode Menu Items

Menu Title	Item	Parameters	Description
	Status	OK (Green)	No DID and SDID conflicts are occurring
		Duplicate DID and SDID (Red)	There is more than one stream that uses the same DID and SDID
Decode #	DID	#	Specifies the Data Identification packet to decode
	SDID	#	Specifies the Secondary Data Identification packet to decode
	Send Field Indicator	Selected	The TES-8643 sends a single byte field indicator (either an ASCII '1' or '2') at the start of a field before sending any received data packets. This allows the downstream equipment to synchronize to the video signal.
		Cleared*	Disables this feature

ANC Encode Menus

This section summarizes the **ANC Encode** options for transparent streams.

Encode 1-4 Tabs

Table 8.15 summarizes the options available in each of the four encode tabs. Note that some menu items may be read-only or configurable depending on the selected Encode Mode.

Table 8.15 ANC Encode Menu Items

Menu Title	Item	Parameters	Description
	Status	OK (Green)	No DID and SDID conflicts are occurring
		Duplicate DID and SDID (Red)	There is more than one stream that uses the same DID and SDID
	Encode Mode	Disabled	Upstream data passes through without modification
		Caption CDP	The source provides data that is formatted as Caption Distribution Packets (CDPs). This is the type of data used in CEA-708 captioning for HDTV. The source must provide CDP packets correctly timed to the video. That means a CDP must be provided for each Field 1 of the video.
		Subtitle SDP	The source provides data as Subtitle Distribution Packets (SDPs). This is the type of data used to carry WST subtitling information in an HD signal. The data must be formatted according to OP47.
		Custom Packet	Insert data using the packet header to parse and align incoming data.
		Byte	Insert data as it is received. Refer to **Table 8.16** on page 8-17 for other Byte Mode settings which can modify data flow.
	Respond as Proxy Device	Selected	TES-8643 communicates as a proxy device using response code value 128
		Cleared*	Disables this feature. Select this option if you are using an automation system that does not recognize the proxy response code.
DID		#	Specifies the Data ID and Secondary Data ID values to be used for the corresponding fields in the encoded Ancillary Data Packet as defined by SMPTE 291M. The default values for the remaining options in this tab depend on the Encode Mode selected.
SDID		#	
Encode Line		#	Specifies the line that you wish to insert VANC data into

Table 8.15 ANC Encode Menu Items

Menu Title	Item	Parameters	Description
Encode Channel		Luma	When selected, inserts the VANC packet into the luma channel of the incoming VANC service
		Chroma	When selected, inserts the VANC packet into the chroma channel of the incoming VANC service
Send Field Indicator		Selected	Sends a single byte field indicator (either an ASCII '1' or '2'), at the start of the next field to encode, out the data port to allow the downstream equipment to synchronize to the video signal.
		Cleared*	Disables this feature
Priority		Overwrite*	The TES-8643 inserts data on the line specified. Any existing data with matching DID and SDID in VANC are marked for deletion.
		Local Priority	Enables the local user to insert transparent data simply by sending it to the TES-8643, and to revert to passing network data by simply stopping the sending of local data to the TES-8643.
		Upstream Priority	Enables the network to control the sharing between network and local data. The network can create an insertion opportunity for local data by pausing transmission of network data.
Priority Timeout in Frames		0-60[a]	Specifies the number of frames the TES-8643 will wait before switching away from the priority item
Packet Mode Settings	Packet Identifier[b]	#	Identifies the service type when operating in Packet mode.
Byte Mode Settings - Field #	Data Count[a, c]	#	Sets the maximum number of bytes that will be sent for the specified field.
	Flush Buffer at VANC[c]	Selected	Any data which has been received, at the point when the specified VANC area of the video occurs, will be used to form a packet (with a smaller Data Count if necessary) and will be inserted in the following VANC area.
		Cleared	A data packet will behave as determined by the Data Count parameter.

Table 8.15 ANC Encode Menu Items

Menu Title	Item	Parameters	Description
Byte Mode Settings - Field #	Flush Buffer Timeout[c]	Off	A data packet will behave as determined by the Data Count parameter
		1 Field	Any received data will be inserted, using a smaller data Count if necessary, when no data has been received for one complete video field.
		2 Fields	Any received data will be inserted, using a smaller data Count if necessary, when no data has been received for two complete video fields.
	VANC Header	#	Adds a string of hexadecimal bytes to insert in the header of each Byte mode packet.

a. The default value is 10.
b. Field is read-only when Encode Mode is set to Caption CDP, or Subtitle SDP.
c. Field is read-only unless Encode Mode is set to Byte.

Configurable Settings

Table 8.16 outlines the parameters that are configurable based on the Encode Mode selected. A check-mark indicates that the parameter is configurable.

Table 8.16 Configurable Settings by Encode Mode

Setting	Encode Mode				
	Disabled	Caption CDP	Subtitle SDP	Custom Packet	Byte
DID		✓	✓	✓	✓
SDID		✓	✓	✓	✓
Encode Line		✓	✓	✓	✓
Encode Channel		✓	✓	✓	✓
VANC Priority		✓	✓	✓	✓
Timeout in frames		✓	✓	✓	✓
Send Field Indicator		✓	✓	✓	✓
Packet Mode Settings					
Packet Identifier				✓	
Byte Mode Settings					
Data Count					✓
Flush Buffer at VANC					✓
Flush Buffer Timeout					✓
VANC Header					✓

Default Settings

Table 8.17 summarizes the default settings of the encode parameters based on the Encode Mode.

Table 8.17 Default Settings by Encode Mode

Setting	Encode Mode			
	Caption CDP	Subtitle SDP	Custom Packet	Byte
DID	0x61	0x43	Last value	Last value
SDID	0x1	0x2		
Encode Line	9	9		
Encode Channel	Luma	Luma		
Packet Mode Settings				
Packet Identifier	0x9669	0x5115	Last value	Last value
Byte Mode Settings				
Data Count	Field 1: 255 Field 2: 255	Field 1: 255 Field 2: 255	Field 1: 255 Field 2: 255	Last value
Flush Buffer at VANC	Cleared	Cleared	Cleared	
Flush Buffer Timeout	Off	Off	Off	
VANC Header	0	0	0	

SCTE 104 Tab

Table 8.18 summarizes the options for configuring a transparent stream for SCTE 104 encoding.

Table 8.18 SCTE 104 Menu Items

Menu Title	Item	Parameters	Description
	Status (read-only)	OK (Green)	No DID and SDID conflicts are occurring
		Duplicate DID and SDID (Red)	There is more than one transparent stream that uses the same DID and SDID
	Encode Mode	Disabled	TES-8643 does not monitor incoming data for SCTE 104 messages
		SCTE 104*	TES-8643 monitors incoming data for SCTE 104 messages
	DID (read-only)	#	Specifies the Data ID and Secondary Data ID values to be used for the corresponding fields in the encoded Ancillary Data Packet as defined by SCTE 104 2011.
	SDID (read-only)	#	
	Encode Line	#[a]	Specifies the line that contains the SCTE 104 message
	Encode Channel (read-only)	Luma	Inserts the SCTE 104 message packet into the luma channel of the incoming VANC service
		Chroma	Inserts the SCTE 104 message packet into the chroma channel of the incoming VANC service

a. The default is 9.

SCTE 104 Log Tab

This section summarizes the read-only information displayed in the **SCTE 104 Log** sub-tabs.

Event Log Tab

Table 8.19 summarizes the read-only information displayed in the **Event Log** sub-tab.

Table 8.19 Event Log Menu Items

Menu Title	Item	Parameters	Description
Event Log	yyyy-mm-dd Tt Ty SI PID PT BD AR AN AE		Each field displays an event where: • **yyy-mm-dd** represents the date • **Tt** represents the timestamp (UTC) • **Ty** represents the trigger type • **SI** represents the Splice ID • **PID** represents the Program ID • **PT** represents the Pre-roll Time • **BD** represents the Break Duration • **AR** represents the Auto Return • **AN** represents the Avail Numbers • **AE** represents the Avail Numbers Expected
	Refresh		Updates the fields on the Event Log tab
	Clear Log		Removes the entries from the fields on the Event Log tab

Last Event Tab

Table 8.20 summarizes the read-only information displayed in the **Last Event** sub-tab.

Table 8.20 Last Event Menu Items

Menu Title	Item	Parameters	Description
Port, GPIO #	Timestamp	#	Specific time that the event was processed (UTC value) for the specified port/GPIO
	Type	#	Specifies when the splice occurred
	Splice ID	#	Specifies the Splice ID value in the SCTE 104 message
	Program ID	#	Specifies the Program ID value in the SCTE 104 message
	Pre Roll Time	#	Indicates the Pre Roll Time that was applied
	Break Duration	#	Indicates the insertion length
	Auto Return	#	Indicates whether an auto ACK was sent
	Avail Num	#	Specifies the found Avail value
	Avails Expected	#	Indicates the total number of Avails

SCTE 104 GPIO Encode Menus

Table 8.21 summarizes the options available in DashBoard for the **SCTE 104 GPIO Encode** tab.

Table 8.21 SCTE 104 GPIO Encode Menu Items

Menu Title	Item	Parameters	Description
GPIO #	Type	Start Normal*	Trigger occurs before the splice point
		Start Immediate	Trigger occurs at the exact moment of the splice point
		End Normal	Trigger occurs once the splice point ends
		End Immediate	Trigger occurs before the splice point ends
		Cancel	Cancels the last sent trigger
	Splice ID	#	Specifies the Splice ID value that the TES-8643 searches for in the packet. The TES-8643 activates the GPIO when the specified value matches what is set in the trigger. If the value does not match, the trigger is ignored.
	Program ID	#	Specifies the Program ID value that the TES-8643 searches for in the trigger. The TES-8643 activates the GPIO when the specified value matches what is set in the trigger. If the value does not match, the trigger is ignored.
	Pre Roll Time	4.000 - 16.000[a]	TES-8643 adjusts and applies the pre-roll value (number of seconds) before initiating the trigger. This value is ignored when Type is set to Start Immediate or End Immediate.
	Break Duration	0.0* - 65530.0	Specifies the length (tenths of seconds) for the insertion. This value is ignored when Type is set to End Normal or End Immediate.
	Auto Return	Selected	TES-8643 automatically returns an ACK message to the automation system connected to the specified GPIO port. This is ignored when Type is set to End Normal or End Immediate.
		Cleared*	Disables this feature
	Avail Num	0*-255	Specifies the Avail within the specified Program ID
	Avails Expected	0*-255	Specifies the total number of the expected Avails during the trigger. When set to 0, the **Avail Num** value is ignored.

a. The default is 8 seconds.

SCTE 104 GPIO Decode Menus

Table 8.22 summarizes the options available in DashBoard for the **SCTE 104 GPIO Decode** tab.

Table 8.22 SCTE 104 GPIO Decode Menu Items

Menu Title	Item	Parameters	Description
GPIO # - Match On	Program ID	Selected	Matches the Program ID in the SCTE 104 message
		Cleared	The Program ID is ignored
		Value	Specifies the Program ID value that the TES-8643 searches for in the message. The TES-8643 activates the GPIO when the specified value matches what is set in the message. If the value does not match, the message is ignored.
	Splice ID	Selected	Matches the Splice (split) ID in the SCTE 104 message
		Cleared	The Splice ID is ignored
		Value	Specifies the Splice ID value that the TES-8643 searches for in the message. The TES-8643 activates the GPIO when the specified value matches what is set in the message. If the value does not match, the message is ignored.
	Trigger Delay	#[a]	Augments when the pre-roll begins (in milliseconds). A negative value decreases the pre-roll start time while a positive value adds to the pre-roll start time.
	Ignore Preroll	Selected	Enables the TES-8643 to ignore any pre-roll values and initiate the message immediately
		Cleared	The TES-8643 applies the pre-roll value before initiating the trigger

a. The default is 0.

Decode Status Menus

Table 8.23 summarizes the read-only information displayed in the **Decode Status** tab. The **Status** field in the **Decode Status** tab varies in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Table 8.23 Decode Status Menu Items

Option Title	Item	Parameter	Description
Decode x[a] (DID:# SDID:#)	Status	OK (Green)	TES-8643 is decoding correctly without errors.
		Duplicate DID and SDID on Decode # (Green)	There are two enabled services using the same DID and SDID.
		No Incoming ANC (Yellow)	Matching DID and SDID is not present in the input stream.
		Decode output port not connected (Yellow)	There is incoming data matching the DID and SDID, but the output port is not connected.
		Data present in both luma and chroma (Yellow)	There is data matching the DID and SDID present on both the incoming luma and chroma channels.
		Decoded data overflowed output port (Yellow)	Losing data because the output port can't keep up.
		Decode stream not assigned to output port (Red)	There is data matching the DID and SDID present on both the incoming luma and chroma channels.
	Data Rate (Bytes/Sec)	#	Reports the running average of the number of decoded bytes/second. Note that a value of 0 (zero) triggers an inactivity error if the alarm is enabled on the corresponding port.
	Line	# c f	Indicates the line(s) and channels with decoded data where: • **#** represents the line number. If there are multiple lines, the field reports it as # - # • **c** represents the channel (LUMA or CHROMA) • **f** represents the field (F1, or F2)
	Alarm Enable	Selected	The corresponding **Status** field reports decoding errors
		Cleared	Disables the alarm for the selected decode stream. If an error occurs for this decode stream, the **Status** field will not report it.
Field #	Bandwidth Used (Percent)	#	Indicates the percentage of the data capacity used

a. Where x represents the transparent service or SCTE 104 (DID: 41 SDID:07).

Encode Status Menus

Table 8.24 summarizes the read-only information displayed in the **Encode Status** tab.The **Status** field in the **Encode Status** tab varies in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Table 8.24 Encode Status Menu Items

Option Title	Item	Parameter	Description
Encode x[a] (DID:# SDID:#)	Status	OK (Green)	Encoding is operating correctly without errors
		Passing upstream (Green)	The encode stream is enabled but not in overwrite mode. There is upstream data with the same DID and SDID, which the TES-8643 is letting pass through the encoder because there is either no local data to encode or upstream data has priority.
		Erasing upstream (Green)	The encode stream is enabled in overwrite mode. There is upstream data with the same DID and SDID, which the TES-8643 is erasing because there is no local data to encode.
		Overwriting stream (Green)	The encode stream is enabled in overwrite mode or local priority mode. There is upstream data with the same DID and SDID, which we are overwriting with local data.
		Not sending ANC (Yellow)	There is no data to encode from the incoming port.
		Packet sequence error (Yellow)	Found the packet identifier, the length is valid and there is a footer in the proper location, the checksum is valid, but is out of sequence from the previous packet. The TES-8643 still lets this packet pass.
		Encode input port not connected (Yellow)	One of the following errors is occurring: • The cable(s) to the serial port or ethernet port on the rear module is not secured. • If the input port is an ethernet port, check its status and settings in the **Ethernet** sub-tab of the **Ports** tab.
		Incoming data overflowed output (Yellow)	Data being sent to the encoder is faster than it can be processed. • If the data is sent via the Serial port, the encoder will assert flow control to the transmit computer when needed to avoid losing data. • If the program sending the data does not respect flow control, the TES-8643 will receive more data than it can process and data will be lost.

Table 8.24 Encode Status Menu Items

Option Title	Item	Parameter	Description
Encode x (DID:# SDID:#)	Status	Encode stream not assigned to input port (Red)	• If the encode stream is assigned to the serial port, verify that the serial communication settings are valid. Refer to the section "**Configuring the Serial Data Port**" on page 6-2. • If the encode stream is assigned to an Ethernet port, verify that the Ethernet settings are valid. Refer to the section "**Configuring the Ethernet Data Ports**" on page 6-3.
		Can't find packet header (Red)	Cannot match on the packet identifier in the incoming stream.
		Can't find packet footer (Red)	Missing the packet footer byte, 0x74, which must follow the payload.
		Invalid packet length (Red)	Found the packet identifier but the packet length is too short. There must be at least 7bytes in the packet.
		Packet checksum error (Red)	Found the packet identifier, the length is valid and there is a footer in the proper location, but the checksum is invalid. The TES-8643 still lets this packet pass.
		Duplicate DID and SDID on Encode # (Red)	There are two enabled services using the same DID and SDID
	Data Rate (Bytes/Sec)	#	Reports the running average of the number of encoded bytes/second. Note that a value of 0 (zero) triggers an inactivity error if the alarm is enabled on the corresponding port.
	Alarm Enable	Selected	The corresponding **Status** field reports encoding errors
		Cleared	Disables the alarm for the selected encode stream. If an error occurs for this encode stream, the **Status** field will not report it.
Field #	Bandwidth Used (Percent)	#	Indicates the percentage of the data capacity used

a. Where x represents the transparent service or SCTE 104 (DID: 41 SDID:07).

Appendix C. Configuration Example

In This Appendix

This appendix describes the steps required to set up a working TES-8643 configuration. Many such configurations are possible, this is only one example.

The following topics are discussed:

- Overview
- System Components
- Installing the TES-8643
- Configuration

Overview

Figure 9.1 shows the pieces of equipment involved in a simple data distribution system. In this configuration, there are two TES-8643 with one acting as an encoder, and the second as a decoder.

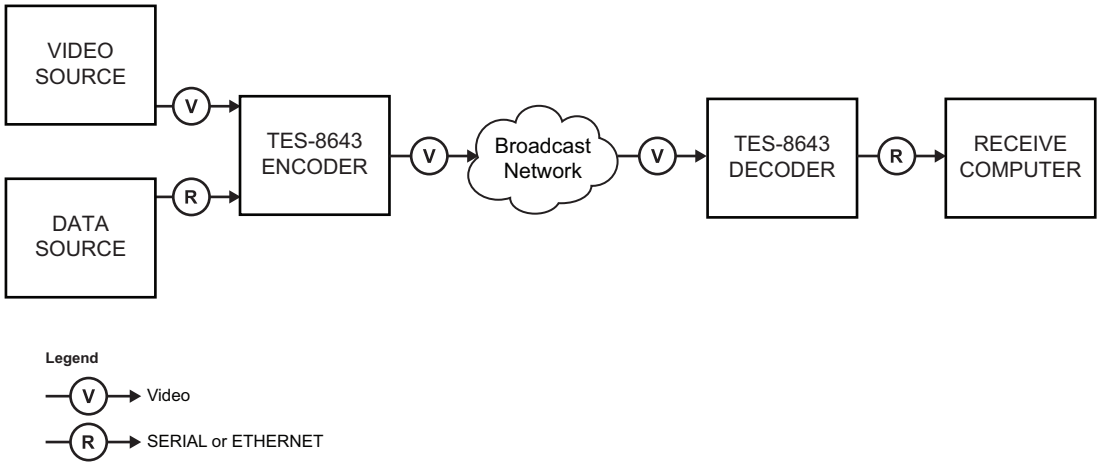


***Figure 9.1** Workflow Diagram — Simple Data Distribution System*

Note — *In this appendix, the term 'encoder' is used to refer to a TES-8643 which is being used to insert data into the video signal, and 'decoder' is used to refer to a TES-8643 which is extracting data from the video signal.*

Example: Raw Data Carriage in VANC

You want to use VANC through SDI as an end-to-end one-way data channel. The data output at the receive end must be identical to the input data at the transmit end, except for propagation delay. In this simple example, we will use Telnet to send text through VANC.

System Components

This section briefly describes the components seen in the use case presented in **Figure 9.1**.

Data Source

The Data Source executes application programs that supply data to the encoder.

In practical applications, data is sent to the TES-8643 encoder by application programs which may be written specifically for the data distribution system. Note that proper software timing may be critical to proper transmission of data.

In this example, a standard Telnet client, such as Tera Term, is used to send text that you type to the TES-8643.

TES-8643 ENCODER

The TES-8643 can encode up to four different input data streams into VANC lines of the SDI input. In this example, we will encode just one stream using transparent Byte mode.

Data Source to TES-8643 Link

The link between the Data Source and the TES-8643 encoder, and between the TES-8643 decoder and receive computer, are a combination of Ethernet (LAN) and serial connections. In this example, we will use an Ethernet connection.

TES-8643 DECODER

The TES-8643 can decode up to four different data streams from VANC lines of the SDI input. In this example we will decode one stream.

TES-8643 DECODER to Receive Computer Link

The link between the TES-8643 decoder and the receive computer can be any combination of LAN and serial connections, as discussed above for the Data Source to TES-8643 Encoder link.

In this example, the Receive computer runs a Telnet client, just as the Data Source does.

RECEIVE Computer

The receive computer processes the extracted VANC data. The program that processes the data can be either a Ross Video application program or a user-provided program. The term “computer” is used here to represent any type of device that can accept data from the TES-8643; for example, in the case of captioning data, this might be an MPEG video encoder.

Installing the TES-8643

This section provides a general overview of how to cable the two TES-8643 and external equipment.

Installing the TES-8643 cards in an openGear frame

The openGear frame is a 2RU high density modular frame, designed to accommodate up to 20 openGear cards.

1. Install each rear module in the backplane of the openGear frame as outlined in the section "**To install the rear module in an openGear frame**" on page 2-5.
2. Install the first card in the appropriate slots as outlined in the section "**To install the card in an openGear frame**" on page 2-6.
3. Connect the **OUT 1** BNC on the first TES-8643 to the **IN 1** BNC on the second TES-8643. (**Figure 9.2**)

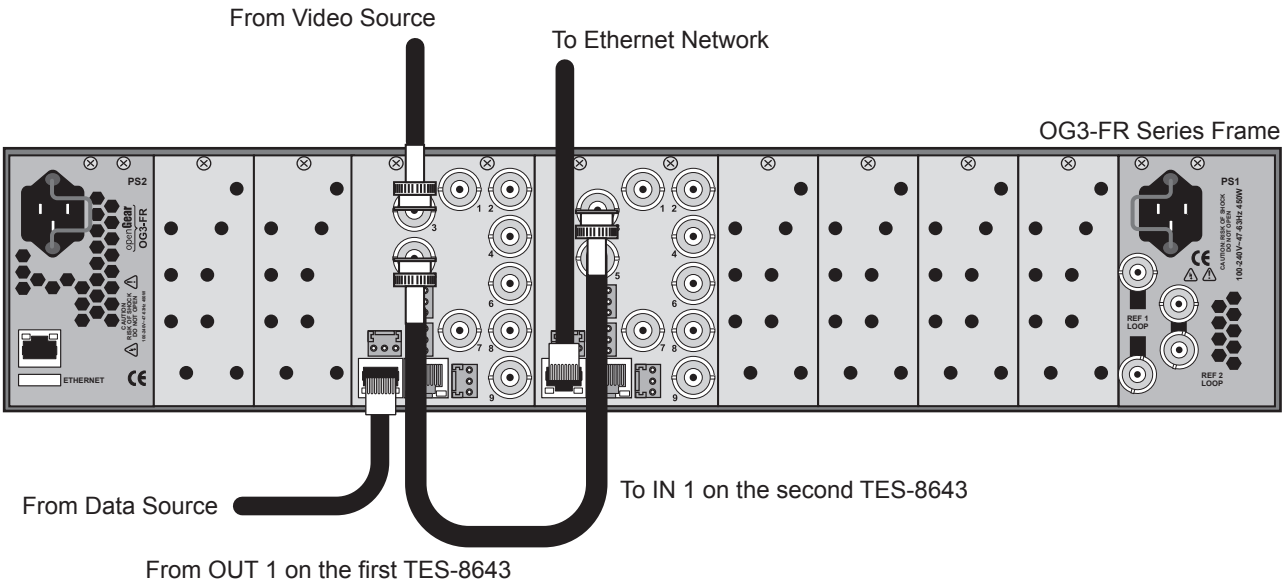

From Video Source
To Ethernet Network
OG3-FR Series Frame
From Data Source
To IN 1 on the second TES-8643
From OUT 1 on the first TES-8643

***Figure 9.2** Connections between the TES-8643*

4. Connect the **IN 1** BNC on the first TES-8643 to the video source. (**Figure 9.2**)
5. Connect the Data Source and the first TES-8643 to the Ethernet. (**Figure 9.2**)
6. Connect the receive computer and the second TES-8643 to the ethernet.

Configuration

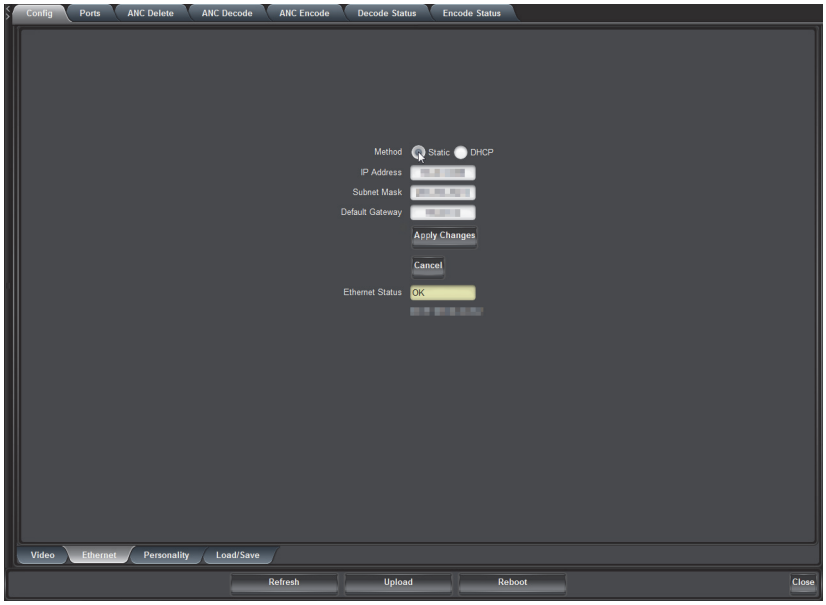
This section outlines how to configure each TES-8643 in the example presented in the section "**Overview**" on page 9-2.

Set up Communications for each TES-8643

Perform the following procedure for each TES-8643 to set up basic communications for the card, select a reference source, and configure the video outputs.

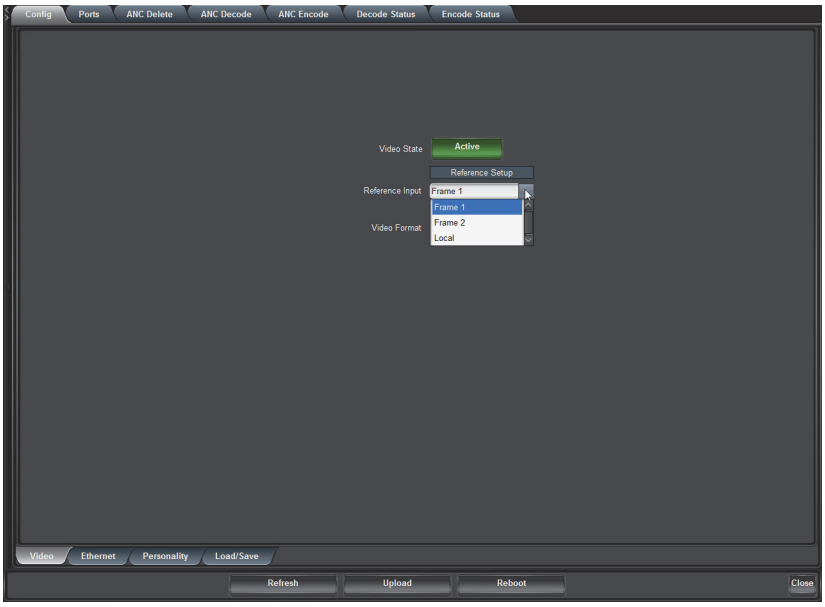
To set up communications for a TES-8643

1. Configure the Ethernet communications on the TES-8643 as outlined in the section "**Ethernet Communication Setup**" on page 3-3. This allows the card to communicate with the Network Controller card in the openGear frame and DashBoard.



TES-8643 — Ethernet Communications

2. Configure the reference source for the TES-8643 as outlined in the section "**Selecting the Timing Source**" on page 3-4.



TES-8643 — Reference Source Selection

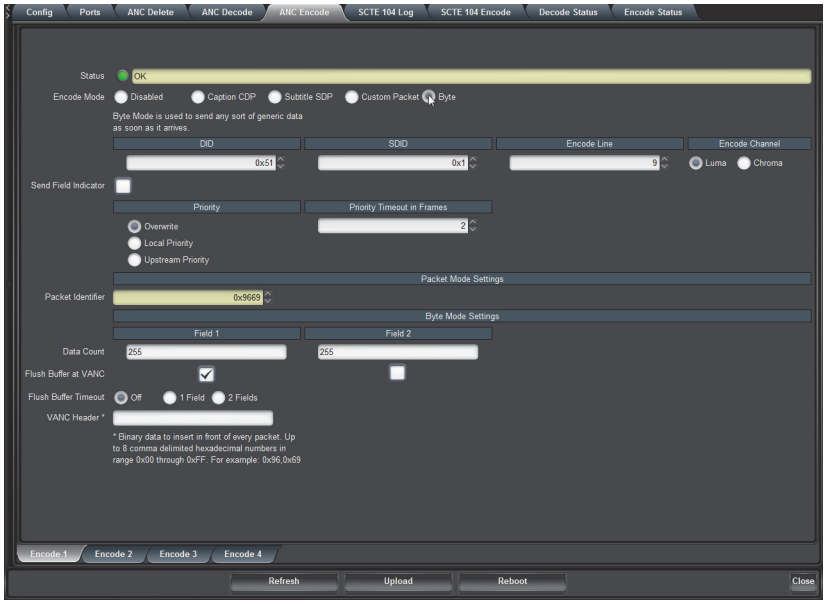
3. Select the video format for the input as outlined in the section "**Configuring the Video Outputs**" on page 3-5.

Configure the First TES-8643 for Encoding

The first TES-8643 communicates with the Data Source over Telnet, and then sends the encoded service over VANC to the second TES-8643.

To configure the first TES-8643 for encoding

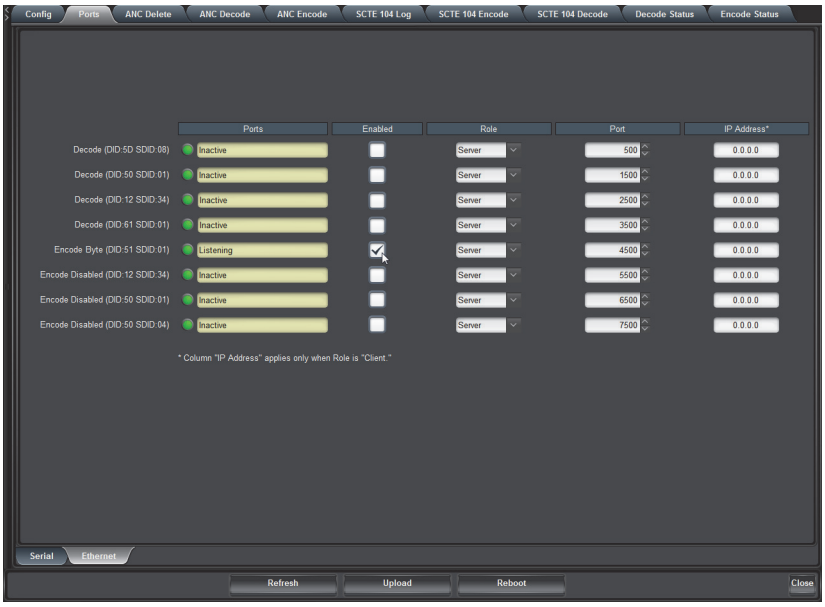
1. From the **Device View**, select the **ANC Encode 1** tab.
2. Configure the first TES-8643 as outlined in the section "**To configure the TES-8643 for encoding**" on page 4-7 and setting the **Encode Mode** to **Byte**.
3. Enable the **Flush Buffer at VANC** for **Field 1**.



Configuring Encode 1 in Byte Mode (DID:51 SDID:01)

To configure the data ports on the first TES-8643

1. Verify that the encoding streams configured in the section "**To configure the first TES-8643 for encoding**" is now listed in the **Ports** sub-tabs.
2. To configure the **Ethernet** port, follow the instructions in the section "**Configuring the Ethernet Data Ports**" on page 6-3.
3. Note the port number selected here, and the IP Address displayed in the **Network Status** tab. You will need these settings to configure your transmit Telnet session.



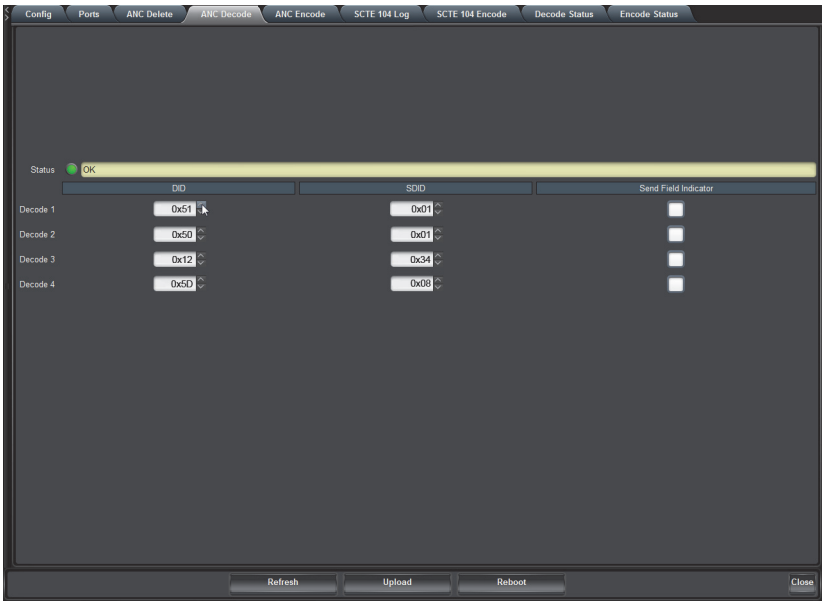
Assigning Port 4500 to Encode Byte (DID:51 SDID:01)

Configure the Second TES-8643 for Decoding

The second TES-8643 receives the encoded service over VANC from the first TES-8643 and communicates with the receive computer over ethernet.

To configure the second TES-8643 for decoding

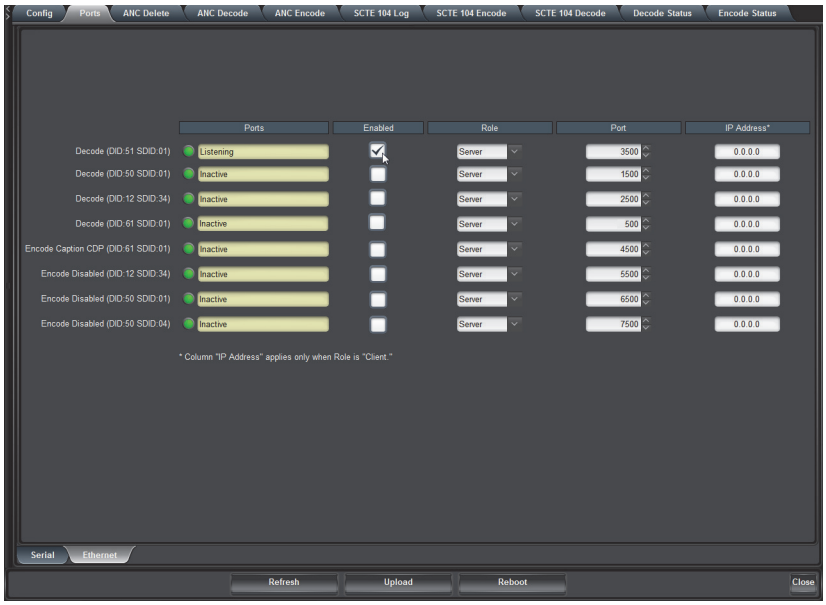
1. From the **Device View**, select the **ANC Decode** tab.
2. Configure the second TES-8643 as outlined in the section "**To configure the TES-8643 to decode**" on page 5-3.
3. Set the DID and SDID to the same values you selected for encoding on the first TES-8643. Note that in the following example, Decode 1 was configured with DID:51 SDID:01 just like Encode 1 in the example provided above.



Configuring Decode 1 (DID:51 SDID:01)

To configure the data ports on the second TES-8643

1. Verify that the decoding streams that you configured in the section "**To configure the second TES-8643 for decoding**" are now listed in the **Ports** sub-tabs.
2. To configure the **Ethernet** port, follow the instructions in the section "**Configuring the Ethernet Data Ports**" on page 6-3.
3. Note the port number selected here, and the IP Address displayed in the **Network Status** tab. You will need these settings to configure your receive Telnet session



Assigning Port 3500 to Decode 1 (DID:51 SDID:01)

Using Telnet

This section briefly summarizes how to use Telnet to connect the two TES-8643 to the transmit and receive computers.

To use Telnet

1. Run the Telnet client programs on the Data Source and Receive computer.
2. In the Data Source's Telnet, connect to the TES-8643 Encoder at the IP address and port that you set.
3. In the Receive computer's Telnet, connect to the TES-8643 Decoder at the IP address and port that you set.
4. Any characters you type in the Data Source's Telnet session should appear in the Receive computer's telnet window. If you disconnect the SDI cable between the two TES-8643 cards, the text will no longer pass through to the Receive computer.

To illustrate some subtle buffer behavior

1. De-select both **Flush Buffer at VANC** boxes.
2. Set the data count to 8.
3. Type again on your transmit Telnet session and see how nothing is received until multiples of 8 characters are typed.

Appendix D. Specifications

In This Appendix

This appendix provides technical information on the TES-8643. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications
- Communication Specifications
- Switch Lines Overview
- Output Format Reference Compatibility
- Commonly Used Services

Technical Specifications

Table 10.1 provides the specifications table for the TES-8643 when using the 8320AR-055.

Table 10.1 TES-8643 and the 8320AR-055 Technical Specifications

Category	Parameter	Specification	
Serial Digital Video Inputs	Number of Inputs	1	
	Data Rates and SMPTE Standards Accommodated	480i 59.94Hz (SMPTE 259M)	
		576i 50Hz (SMPTE 259M)	
		1080i 59.94Hz (SMPTE 292M)	
		1080i 50Hz (SMPTE 292M)	
		720p 59.94Hz (SMPTE 292M)	
		720p 50Hz (SMPTE 292M)	
		1080p Level A 59.94Hz (SMPTE 424M)	
		1080p Level A 50Hz (SMPTE 424M)	
	Impedance	75ohm terminating	
	Return Loss	IN 1:	SD/HD 1.5G: > 15dB
			HD 3G: >10dB
	Equalization (using Belden 1694A cable)	IN 1:	SD: 300m
			HD 1.5G: 140m
			HD 3G: 60m
Serial Digital Video Outputs	Number of Outputs	4	
	Impedance	75ohm	
	Return Loss	OUT 1:	SD, HD 1.5G: >13dB
			HD 3G: >10dB
	Signal Level	800mV ±10%	
	DC Offset	0V ±50mV	
	Rise and Fall Time (20-80%)	SD:	900ps typical
		HD 1.5G:	150ps typical
		3G:	130ps typical
	Overshoot	<10% typical	
Environment	Maximum Ambient Temperature	40°C	
Power	Maximum Power Consumption	19W	

Communication Specifications

This section provides additional information on the different connector types of the TES-8643 rear module.

Serial Port

When building cables to interface to the card **Serial** port, it is recommended to use CAT-5 or CAT-5e cable with the standard Ethernet wiring color coding. **Table 10.2** shows the pin assignment of the **Serial** port located on the rear module.

Table 10.2 RJ-45 Pin Assignment

RJ45 Pin	RS-232	RS-422	RS-422 Null
1	n/c	Tx+	Rx+
2	Rx	Tx-	Rx-
3	Tx	Rx+	Tx+
4	n/c	n/c	n/c
5	n/c	n/c	n/c
6	n/c	Rx-	Tx-
7	GND	GND	GND
8	GND	GND	GND

Ethernet Port

The **Ethernet** port on the rear module is used to connect to an ethernet network for communications, and software upgrades using DashBoard

Note — *Contact your IT Department before connecting the card to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for the card.*

Switch Lines Overview

The video source provides the serial digital video signal into which the TES-8643 encoder inserts the VANC data. The video signal may be any of those listed in **Table 10.3**.

Table 10.3 Switch Lines and Last VANC Line

Type	Format	Defining Standards	Switch Line(s)		Vertical Blanking Last Line	
			Field 1	Field 2	Field 1	Field 2
259M	480i 59.94Hz	ITU-R BT.601, SMPTE 125M	10	273	19	282
	576i 50Hz	ITU-R BT.601	6	319	22	335
292M	720p 50Hz	SMPTE 296M	7		25	
	720p 59.94Hz	SMPTE 296M	7		25	
	1080i 50Hz	SMPTE 274M	7	569	20	583
	1080i 59.94Hz	SMPTE 274M	7	569	20	583
424M	1080p 50Hz Level A	SMPTE 425M	7		41	
	1080p 60Hz Level A	SMPTE 425M	7		41	

Output Format Reference Compatibility

The TES-8643 locks the output video to an external reference. Reference compatibility is shown in **Table 10.4**. A check-mark indicates a supported output reference compatibility.

Table 10.4 Output/Reference Compatibility

Reference	Output							
	480i 59.94Hz	720p 59.94Hz	1080i 59.94Hz	1080p 59.94Hz	576i 50Hz	720p 50Hz	1080i 50Hz	1080p 50Hz
480i 59.94Hz	✓	✓	✓	✓				
720p 59.94Hz		✓		✓				
1080i 59.94Hz	✓	✓	✓	✓				
576i 50Hz					✓	✓	✓	✓
720p 50Hz						✓		✓
1080i 50Hz					✓	✓	✓	✓

Commonly Used Services

Table 10.5 lists the commonly used VANC services and is provided for guidance only. Refer to the specific SMPTE standard for details.

Table 10.5 DID/SDID VANC Services

Type	DID	SDID	SMPTE	Description	Location
2	060	060	12M-2	Ancillary Time Code	See **Table 10.6**.
2	061	001	334-1	EIA 708B data mapping into VANC space	VANC, second line after the switch line to last VANC line before AP, Y-stream
2	061	002	272M	EIA 608 data mapping into VANC space	
2	045	001	S2020-1	Compressed Audio Metadata, HD-SDI, no association	VANC, second line after the switch line to last VANC line before AP, Y-stream
2	045	002	S2020-2	Compressed Audio Metadata, HD-SDI, channel pair 1/2	
2	045	003	S2020-3	Compressed Audio Metadata, HD-SDI, channel pair 3/4	
2	045	004	S2020-4	Compressed Audio Metadata, HD-SDI, channel pair 5/6	
2	045	005	S2020-5	Compressed Audio Metadata, HD-SDI, channel pair 7/8	
2	045	006	S2020-6	Compressed Audio Metadata, HD-SDI, channel pair 9/10	
2	045	007	S2020-7	Compressed Audio Metadata, HD-SDI, channel pair 11/12	
2	045	008	S2020-8	Compressed Audio Metadata, HD-SDI, channel pair 13/14	
2	045	009	S2020-9	Compressed Audio Metadata, HD-SDI, channel pair 15/16	
2	041	001	S352M	Video Payload Identification for Digital Interfaces	HANC, immediately following EAV word. Refer to ***SMPTE 342M*** for format specific line number(s).
2	041	005	S2016-3	AFD	VANC, second line after the switch line to last VANC line before AP, Y-stream
2	041	007	S2010	ANSI/SCTE-104 triggers	VANC, second line after the switch line to last VANC line before AP, Y-stream

HANC Services

Table 10.6 lists the HANC services that could be decoded by the TES-8643. Refer to ***SMPTE RP291*** and other SMPTE standards for details.

Table 10.6 HANC Services

Payload Type	Video Format (Interface Line Numbers)		
	1125 Interlaced	1125 Progressive	750 Progressive
ATC_LTC	HANC, line 10	HANC, line 10	HANC, line 10
ATC_VITC1	HANC, line 9	HANC, line 9	HANC, line 9
ATC_VITC2	HANC, line 571	HANC, line 9	HANC, line 9

Appendix E. Software Licenses

In This Appendix

This appendix provides third-party software license information for your TES-8643. This product includes multiple software components which are individually licensed under one or more of the following licenses included in this appendix.

This appendix contains the following sections:

- BSD
- Dual GPL/Free Type
- GPL
- LGPL
- IJG
- MIT
- zlib

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zlib

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files ftp://ds.internic.net/rfc/rfc1950.txt (zlib format), rfc1951.txt (deflate format) and rfc1952.txt (gzip format).

Appendix F. Service Information

In This Appendix

This appendix contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your TES-8643, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the "**Contact Us**" section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reference Signal Status** — Verify that the reference (blackburst or tri-level) is supplied on one of the available reference inputs. Check the **Reference Status** field in the **Signal** tab in DashBoard.
4. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
5. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
6. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.
7. **Re-load the Factory Defaults** — If the card appears to be working and reports no errors, but is not generating an active picture or outputs black, restoring the default factory configuration may fix the problem. Refer to the section "**Loading the Factory Defaults**" on page 3-9 for information.

Warranty and Repair Policy

The TES-8643 is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your TES-8643 proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this TES-8643 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This user manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the TES-8643 are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your TES-8643, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your TES-8643. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

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